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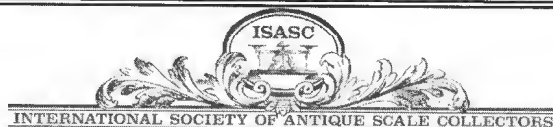
Cover Picture

Sampson Mordan made all sorts of objects for the desk, including huge numbers of very fine roberval postal scales. He also made a few scales of other designs for postal or coin use. This equal arm balance, possibly his rarest postal scale, with its scrolly surface decoration, is discussed on page 2989. Note the double wire hooks.



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Found, the Missing Mordan

BY JOHN BARNETT

I have, for some time now, wanted to write an article for *Equilibrium*, on an exciting scale I had found. Unfortunately, it was not until recently that the opportunity proffered itself, as the scale I was ardently searching for had long eluded me. So you can imagine my surprise, when browsing through over 1,500 lots at a local Sussex auction house, I spotted, amongst a load of tat in a glass cabinet, this delightful, almost miniature, jeweller's gold scale, (Figure 1). It had the unmistakable aura of quality about it. But on closer examination, my head started reeling and my heartbeat increased rapidly. Could this be the missing link in the chain?

The box and drawer are made of light mahogany, beautifully proportioned, with a pearl ribbed button on the drawer. The dimensions of the box are $5\frac{3}{4}$ inches (140 mm) wide and 3 inches (75 mm) deep. The lever for lifting, the support drum for the pivot and the sliding pillar are made of cast brass. The often-repaired plastic domed cover is, presumably, a later replacement for the original glass dome. The overall height from the base to the top of the dome is 7 inches (180 mm).

On first impression the scale suggests a date of around 1820, although the lifting mechanism seems to be highly innovative for this period. (Figure 2.) But when I examined the top of the box and saw on the left-hand side the stamp S MORDAN & Co MAKERS, and on the right hand side WARRANTED, and also S MORDAN & Co. stamped on the lever lift, I realised why I had been so taken by its quality. (Figure 3) Sampson Mordan has always been renowned for the high quality of his postal scales.

When I opened the drawer inside I found a tiny green box, embossed in gold, G.Wts. (Figure 4) When I opened the box I found a little parcel of 19th-century diamond carat weights (which are obviously not G. Wts), with fractional flat brass weights. I presume that the scale was intended to weigh gold coin, having the box for Gold

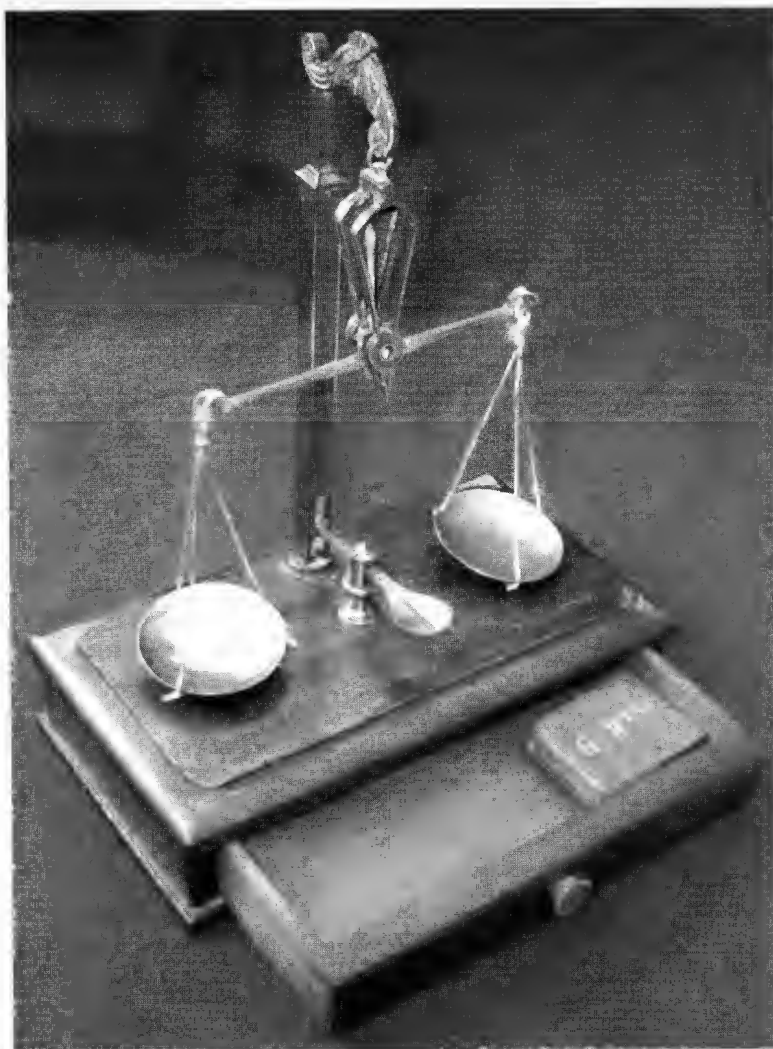


Figure 1. ▲▲ Very small pillar scale with lever lift, signed S MORDAN & Co WARRANTED on the box. The pans rest on the mahogany box until the lever is pressed, whereupon the top of the pillar is raised, taking with it the whole scale. This prevented swinging while the pans were loaded with a coin and weights. The original glass dome is missing, replaced by a plastic dome.

Figure 2. >> The neat lever lift has not been seen on an English coin scale previously. The lever is stamped S MORDAN & Co.

Weights, but being subsequently used to weigh diamonds. It would not be accurate enough to weigh diamonds I suspect, but people are amazingly happy to use a scale that is not suitable for its task!

The design of the sight-hole shears is unconventional, with the modified diamond shape and the shiny back-plate made of nickel. (Figure 5) A back-plate was a feature of pharmaceutical balances in the 19th century, but not a feature of gold or coin balances.

The support hanger is cast with a scroll pattern that is not at all like the plain support arm of the more scientific balances with lever lifts. In fact, I know of only two similar Mordan castings (a) the cast pillar of the Mordan equal-arm postal scale, (Figure 6), which can be dated between 1840 and 1871, because the weights are marked in 1/2 oz units of POSTAGES, and (b) the very rare ro-berval postal scale with a scrolly cast A-frame, (Figure 7).

The three-dimensional scroll surface decoration is not at all typical of Mordan's work. Although his beams and A-frames were presumably cast, rather than cut out from thick sheet, they normally had flat surfaces (which were sometimes subsequently ornamented with engraving or enameling).

The word MAKERS stamped on the wood box top is surely highly significant, as it appears to prove that Sampson Mordan was indeed a maker, (and not just a distributor) of gold and coin scales, and possibly had been making them ever since the inception of his business.

I spent the evening before the sale studying my EQMs, closely examining every mention of S Mordan in the Index. After reading the 10th Anniversary issue, pages 935-950, I found the information for which I had been searching. Nothing is known of any scale produced, or even sold, by Mordan before the introduction of the Penny Post in 1839. Yet he had been in business manufacturing pens, pencils, inkstands, etc. since 1815. But what was known was that he had produced a rare set of a sovereign and half-sovereign weight, which was kept together in a tiny morocco case. See EQM page 1936 and Figure 4.



Figure 3. ▲▲ S Mordan usually stamped his name into the brass not into the wood. But it is worth checking for names stamped into wood, as examples are known by other 19th-century British makers.



Figure 4. ▲▲ This is only the second example known of the tiny boxes Mordan made to hold Gold Weights. This example is green leather, the other is red. The gold coins current at this period were the sovereign and the half-sovereign.



Figure 5. ▲▲ Close-up showing the sight-hole shears with the back-plate. A back-plate started to be used on pharmaceutical balances around 1815, but was not normally used on coin balances. The intention was to provide a white background so that the pointer showed more clearly. The scrolls on the hanger show clearly. They are a very unusual feature on Mordan scales - but the whole scale shows unusual features!

Figure 6. >> Three dimensional surfaces are exceptionally rare on Mordan's scales. This brass pillar, shown also on the Cover, is on an equal-arm postal scale by Mordan. The brass is patinated to give it an "antique finish", very popular in the 1840s and 1850s.



But no scale had ever been found for which these weights were made. I believe that this example is the missing scale.

My scale (yes, I bought it!) was found to have come from a long-established jeweller's shop which is now defunct. It had clearly been used during the second half of the 19th century (when plastic domes were

first made) and before the introduction of the new metric carat weights in 1907, as a diamond weighing scale. I earnestly welcome comments from more learned members of our august society.

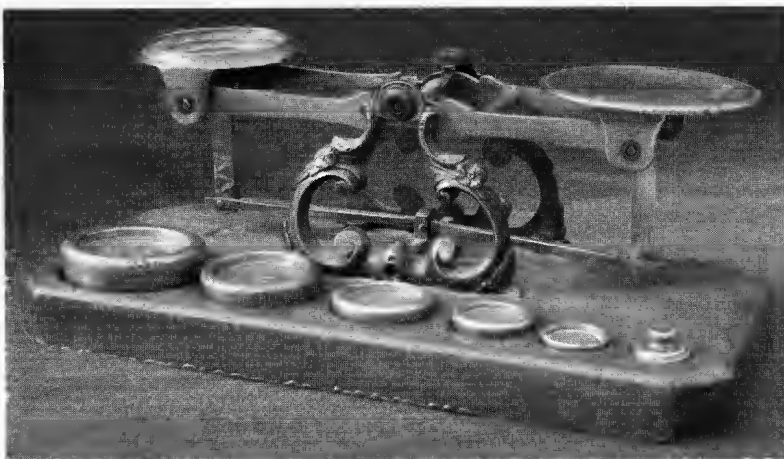
Acknowledgements

With thanks to the owner for permission to use the photograph of his roberval postal, and thanks to Thomas Allgeier for taking the photographs.

Biography

Although John Barnett has been an antiques dealer for over 30 years, he had never considered scales and weights as particularly interesting until he met Ron Wilkinson (ISASC Europe's Chairman 1996-99) at a West-country auction in 1996. He joined ISASC and after his first meeting, he was completely hooked. Now his two children [in their 20s], who seem to spend their lives travelling the world, are under strict instructions to contact him when they come across anything of possible interest.

Figure 7. ▼▼ The only known example of a scroll surface decoration on a Mordan postal roberval scale.



Howell and James

BY ANDREW J CRAWFORTH

One firm, amongst the many who retailed Mordan postal scales¹, stands out as a superior outlet: HOWELL & JAMES of Lower Regent Street, London, and 5, 7 & 9 Regent Street, London. They also had an additional outlet in Paris. They were founded in 1819 as retail jewellers and silk mercers, some ten years after the upheaval of the French wars. Regency ladies and gentlemen, in the heart of thriving London, required dandified clothes and fine jewels, no longer easily obtained from France. Howell & James later became suppliers to Queen Victoria, with a Royal Appointment, a sure sign of the regard in which they were held.

Success brought prosperity to the company, and by the 1870s they were probably the largest business



Figure 1. ▲▲ This letter scale was made by Sampson Mordan for Howell & James to retail. It does not have Mordan's name on it, but it has the characteristic straight legs under the pans, it has the legs going down through a slit in the stays, it has 'steps' of concentric rings on the weight-pan, and weights with the oz above the numbers. These features are not seen together on any other manufacturers' scales. Originally the whole scale was gilt, although industrious cleaning has removed most of the gold. The bosses are made of silver, with royal blue enamel round each silver star.

in London concerned with 'art manufacture'.² They retailed, amongst other things, art ceramics, clocks, furniture, desk furniture, dresses and metalware. By 1865 they employed over 100 staff. They exhibited at the Great Exhibition of 1851 and went on to exhibit at many of the international exhibitions until they ceased trading in 1911.

By 1870 they were commissioning artistic pieces that were right at the forefront of the 'Arts and Crafts movement'.³ They retailed goods designed by, amongst others, Dr. Christopher Dresser, one of the greatest designers of the 19th century.⁴ They went on to encourage the designers who evolved the Art Nouveau style in Britain, so were incredibly influential in dragging the British away from the florid fashions of the Victorians.

Several different postal scales retailed by Howell & James have been seen, all of them made by the most prestigious

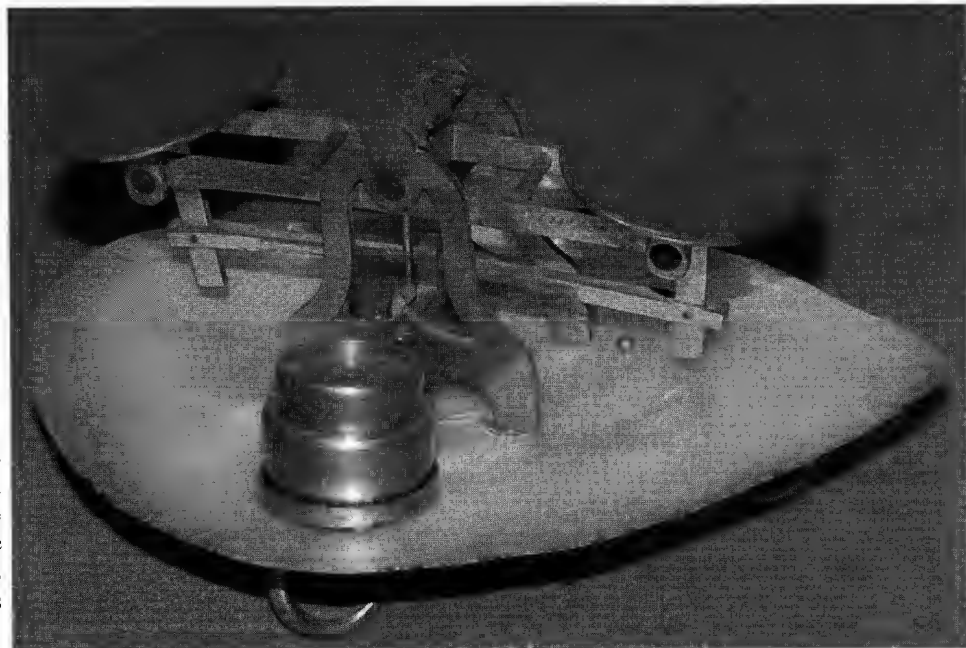


Figure 2. ▲▲ Detail of figure 1, showing the stamp of Howell & James, and the saltire cross of St. Andrew, the patron saint of Scotland.



Figure 3. ▲▲ Detail of figure 1, showing the silver boss cemented into the base. The star is surrounded by royal blue enamelling. The engraving was done by hand, and was almost never the same on two scales.

Figure 4. >> Another Mordan made for Howell & James. This design of legs and A-frame, both extended downwards, is a relatively rare design by Mordan. No purpose seems to be served by such extensions. The gilt brass looks very attractive with the pearly white abalone shell. The weights are also the less common type, being tall and narrow. Note the little 'dish' in which the weights sit, yet another less common feature of Mordan's designs.



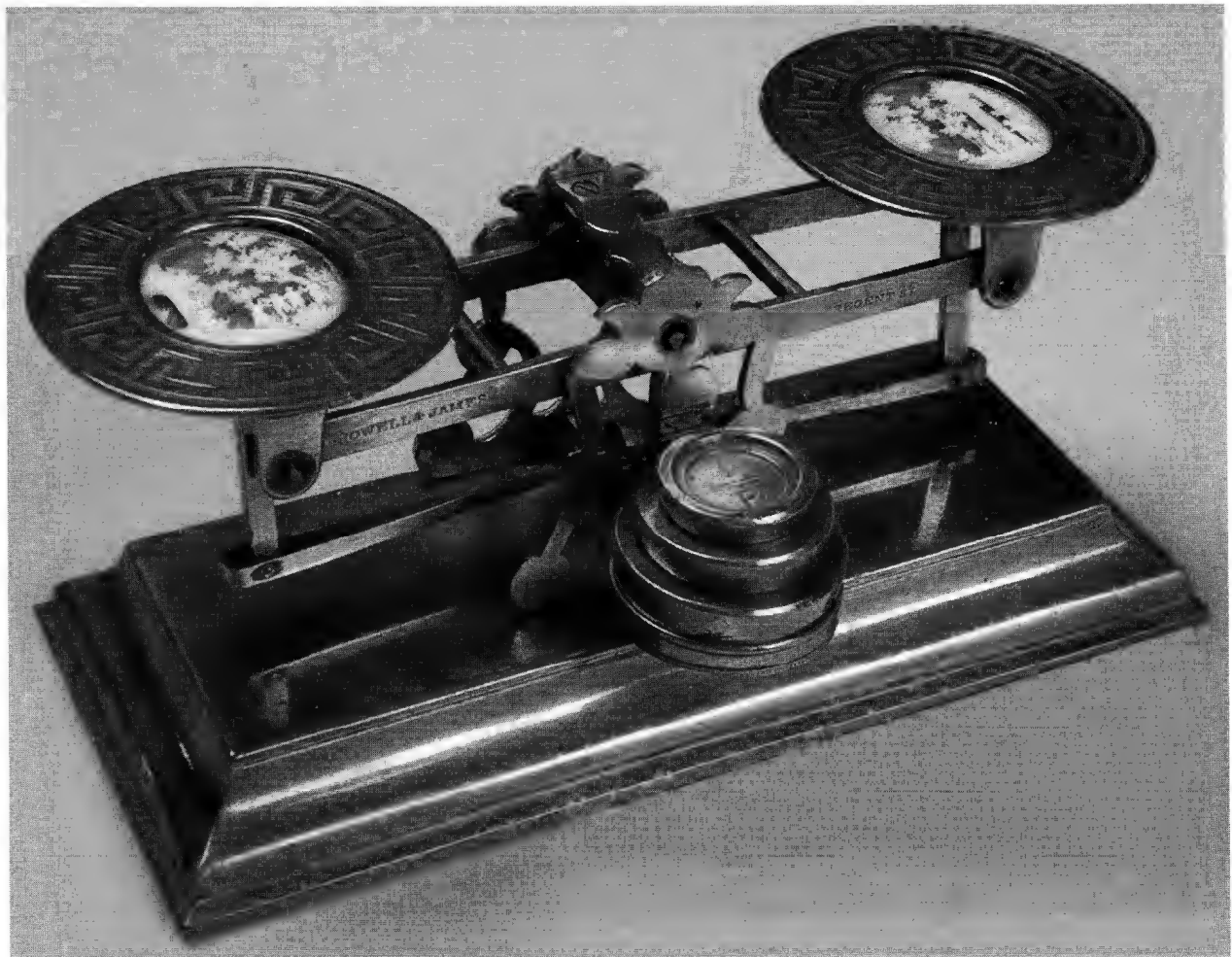


Figure 5. ▲▲ The basic design of this Mordan made for Howell & James is very plain and conventional, with a simple gilt brass base and smooth linkages. But to see it in reality, with the blue and white inserts, is astounding. The viewer needs a lens to fully appreciate the incredibly fine carving of the ivory.

letter-scale maker in London, Sampson Mordan. All the examples seen have been roberval letter scales in elaborate Victorian taste; no scales are known by Mordan in the high Arts and Crafts style.

Figure 1 & 2 show the Scottish saltire cross of St. Andrews as an A-frame. It points up the enthusiasm for all things Scottish once Queen Victoria and Prince Albert had bought Balmoral Castle in Scotland in order to have family holidays in the Highlands. The fine quality engraving is typical of Mordan's workshops, as are the enamelled silver bosses. (Figure 3) The weights are of Mordan design, with a raised inner rim to prevent wear, from 8 P. down to 1 P^s



Figure 6. ▲▲ The Greek key pattern was hand-engraved into the brass before the plate was plated in gold. The Chinese people and the trees were individually carved from ivory, and mounted onto a blue background, with the people in front of the trees. Shadows fall onto the rear carvings, giving a very three-dimensional effect. The fragile carving is covered by a domed glass to protect it.

Occasionally Mordan went to extreme lengths to produce an original design, as in Figure 4. To use an abalone shell, polished to show its mother-of-pearl interior, was certainly exotic but was scarcely practical, as the shell was fragile, and easily damaged when knocked. Howell & James specialised in the unusual and exotic, so Mordan can be considered to have produced a scale perfectly suited to Howell & James!

The last figures, 5 and 6, show a Mordan retailed by Howell & James of the most amazing delicacy. The inserts in the pans are minutely carved Chinese figures and trees in a landscape. Each ivory piece is three-dimensional, and some pieces are about 1/4 inch high! It is difficult to see how the pieces are held in relation to each other, but fixed they are, beneath curved glass covers. This is the only example known by Mordan of this fragility and this method of manufacture.

Howell & James sold Mordans with many finishes. Examples are known with porcelain plaques of roses in a gilt scroll ground, plain gilt oval plates, pietra dura plaques and one with five Wedgwood plaques, all top quality scales from a superior retailer.

Acknowledgements

With thanks to Bob Stein for information, and to David Thomas and Leslie Vandenburghe for permission to show their scales. Photographs by D F Crawforth-Hitchins and David Thomas.

Notes & References

1. Howell & James had considerable competition from other high-class retailers. At least 60 were in Britain, 39 of whom were in London, and seven of whom were in direct competition on Regent's Street.
2. 'Art manufacture' was the manufacture of everyday and decorative objects of which artistic design was the predominant feature.
3. 'Arts & Crafts movement' meant work done by or under the auspices of the Arts and Crafts Exhibition Society, founded in London in 1888. Howell & James encouraged young innovative designers to produce modern designs with references to the past, made using traditional methods, inexpensively, by craftsmen and women. The items are distinguished by their external construction, often used as part of the design.
4. Dr. Christopher Dresser's designs were a hundred years ahead of their time. He believed that modern manufacturing techniques could be combined with good clean designs, at a price affordable by the populace. He was heavily influenced by Japanese designs.
5. P, the abbreviation of "Postages", was the half-ounce unit used to calculate the postage due on a letter before 1871.
6. A fine example with pietra dura plaques is shown on the ISASC website, www.isasc.org/images/. Another gilt brass example with two Wedgwood plaques is shown on the same site.

Showcase

This English Roberval principle balance scale is gilded overall. Its serpentine brass base measures 8 1/4" wide. It has brass legs, pillar, beam, bun feet and matched weights. The engraved plates are inset with Wedgwood medallions. The upward pointer has an unusual guard. The weights are held in a cup that is fastened to the A-frame. This scale is signed HOWELL & JAMES, Regent St.

Bob Stein Collection.



Query

FROM NICOLA WILLIAMS

On a recent visit to Powerhouse Museum in Sydney, we were shown this small pendulum balance by Kopsch, and I'd be very interested if anyone could tell me anything about the maker or the balance. The base measures 5.2cm x 7.8cm, and is marked KOPSCH 317 MAKER. The small case contains sovereign and half sovereign weights, and the scale has graduations 17-20 on the inner edge, and 7-10 on the outer edge. The Powerhouse record says the period was 1885, and it was acquired from the NSW Treasury Department. It was presumably used for checking the weights of these coins.

The full entry from the Powerhouse Museum Stock book reads: *A scale for weighing one guinea and half guineas, by Kopsch. No. 317. Single brass column with a counterweight beam operating a tongue, which moves over a graduated arc. Complete in glass case with two checkweights. Period 1885. The Museum acquired it in 1967, and the donor is described as "Treasury Department, New South Wales, through Mr. Howard, Chief Clerk."*

The small wooden case containing the two weights is inscribed LOWEST CURRENT/WT above the weights, with SOV: below the left hand weight, and 1/2 SOV: below the right hand. sovereigns and 1/2 sovereigns were produced in Australia from 1885. (Sydney Mint dates are 1855-1927, Melbourne 1872-1968, Perth 1899 till it ceased minting circulating currency in 1984, though it still makes medals etc). The minting of Imperial gold coins in ounces ended at Melbourne Mint in 1931 and the dies were destroyed in 1934. UK dies were used for all gold coins made in the Colonies, and gold coin production was entirely under the control of the Royal Mint, London. At Sydney Mint, where the Kopsch is most likely to have been used, production of half-sovereign ceased in 1916 and the sovereign in 1925.

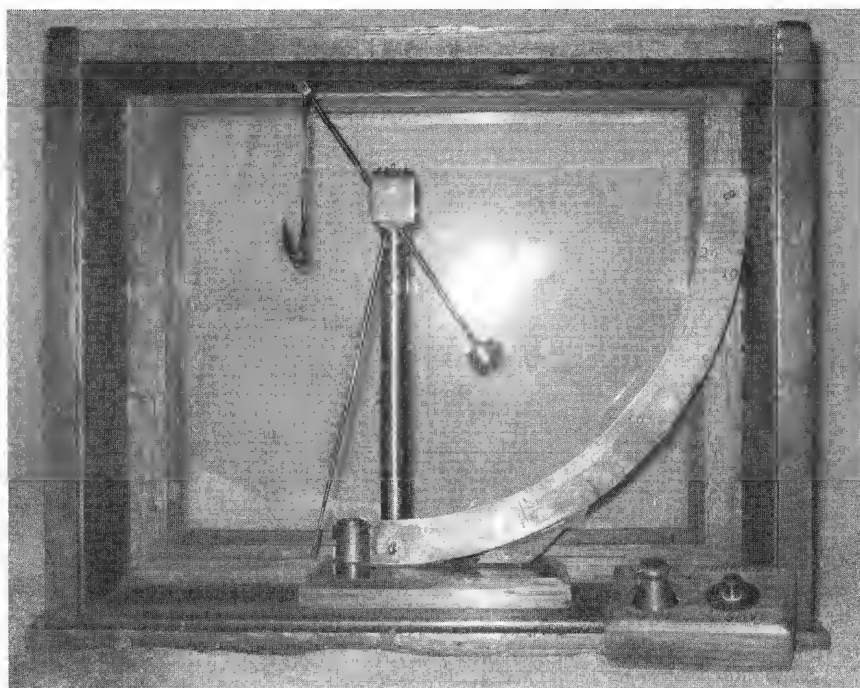


Fig. 1 ▲▲ The Kopsch pendulum sovereign balance in the Sydney Powerhouse Museum.
Can any member answer Nicola's query?

Seville Scale & the Circulation of Coin Weights

BY GUIDO ZAVATTONI

A scale box recently bought on the Internet offers the possibility to address some of the issues left open in the debate published a few years ago in *Equilibrium*. ("English Colonial Scales" Part 1, in EQM 1994, pages 1778-1785, Part 2 in EQM 1994, pages 1818-1819 and Part 3 in EQM 1995, pages 1879-1881).

The case (Figure 1) is rectangular, reddish shagreen covered, with rounded off corners; it measures 172 by 81 by 35 mm, locks with two side hasps and has a central press-button plate catch. The scale beam is of iron, 152mm long and with ends similar to no. 25 in the table on page 2573 of EQM (Spanish box end); the pans are round, made of brass and suspended by green silk cords; shears and pointer form a "lantern" (Figure 2).

The box has a printed label of "Pedro Miguel en Sevilla" with the indication of the year 17.. to be completed by hand.

Four circular recesses contain four round brass weights, all knobbed, and a square fractional weight (Figure 3):

- 8 Reales/8 Escudos: weight 27.02g, dia. 24 mm, with incuse Vooo (for 8 Reales). It bears the verification mark "AP (con-joined) CIO" (Jose Aparicio Barron, verifier in Seville after 1760)¹ and two other verification marks representing a tall tower, most probably the Giralda tower, the verification mark for silver of Seville.

- 4 Reales/4 escudos: weight 13.50 g, dia. 20.5 mm, with incuse oooo (for 4 Reales). It bears the verification mark "Hortyz" (José Ortiz, "contraste" i.e. verifier in Seville between 1731 and 1737) and two "Giralda" marks.



Figure 1 ▲▲

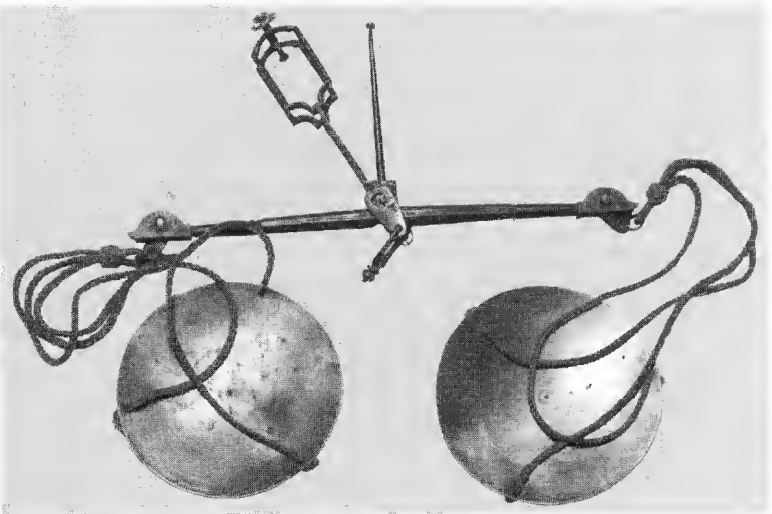


Figure 2 ▲▲

- 2 Reales/2 escudos: weight 6.74 g, dia. 16.8 mm, with incuse oo (for 2 Reales). It bears the verification mark "OTZ" (possibly a shortened mark of Ortiz).

-1 Real/1 Escudo: weight 3.37g, dia. 13.6 mm, with incuse o (for 1 Real). It bears the same verification mark "OTZ".

- Fractional weight (0.43g, slightly more then 2 "quilates") with incuse oo² and with the verification mark "APCIO".

It is not clear which weights, if any, could be the originals, but a date around 1760 could be compatible with all of them.

The first question is whether the box and its contents are Spanish or English. The material (shagreen), shape, button plate catch

and layout of the box all point to an English maker. Shagreen cases were currently manufactured in England at that time³ and it is conceivable that they could have been exported to Spain.

The scales are Spanish and are the work of Pedro Miguel: they show good craftsmanship, especially in the pointer with the lantern sight hole, a feature found in other Spanish scales of that time.

Such craftsmanship fits with Pedro Miguel's claim found in a label affixed to another box, stating his activity as *Constructor de Pessos de Comercio Y Moneda por S.M. Maestro de Armero con intellixencia en todas labores de Yerro y Acero en Sevilla Anno 1776* (Maker of weights for trade and coins by appointment of His Majesty. Master of arms with competence in all kind of works in iron and steel in Seville in the year 1776)⁴.

The origin of the weights is more open to discussion: similar weights were made in England (Fig.4)⁵, but there is no reason to discount the claim of Pedro Miguel to be a maker also of coin weights⁶.

It has also to be remembered that the Decree of Philip V of Spain dated 26 May 1731 provides for the manufacturing of round weights, adding that they should be made by using a lathe ("torneadas"), exactly the way the weights in the box were made.

Finally we have to consider that the weights do not bear any reference to their mass expressed in pennyweights (e.g. XVII 1/2) as in the case of English weights, but they only show the indication of the relevant coin (e.g. Vooo) according to the Spanish

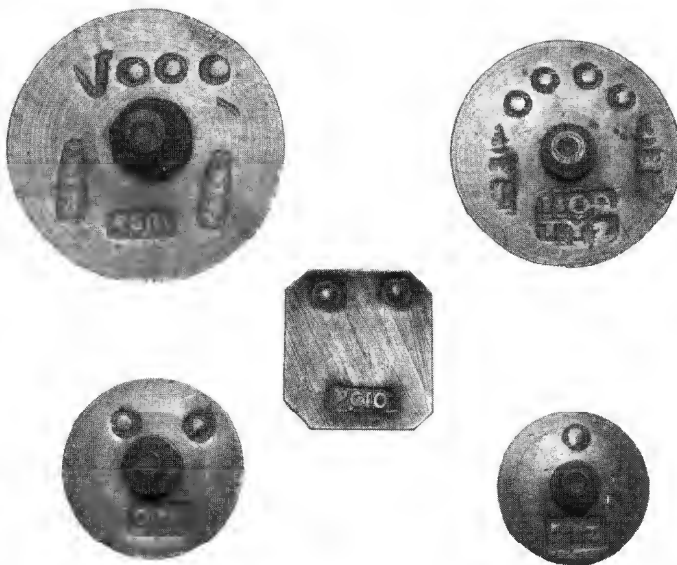


Figure 3 ▲▲

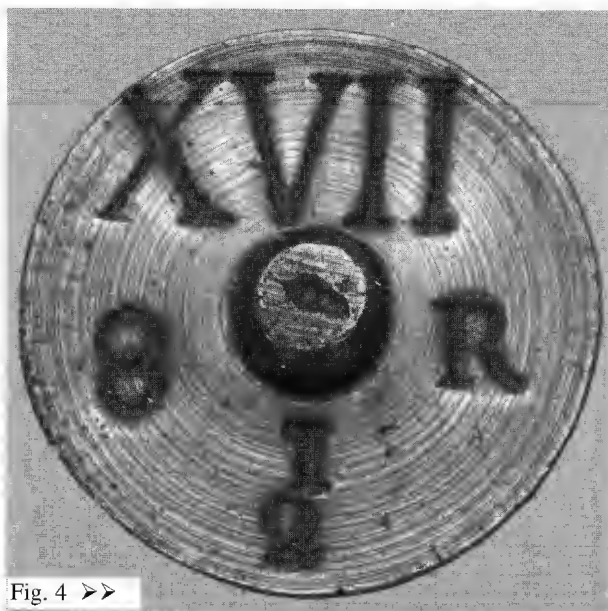


Fig. 4 ►►

practice and Spanish verification. The absence of a Pedro Miguel mark is not surprising since it is in line with the Spanish practice that the maker did not mark his weights unless he was an adjuster or verifier ("afinador" or "contraste")⁷.

We can therefore conclude that the weights in Pedro Miguel's box are Spanish and not English.

After having seen the differences between Spanish and English weights it is worthwhile to examine a third sort of weights that puzzled Gerard Houben (EQM 1994, page 1818), and are still puzzling, among many others, the accurate and knowledgeable curator of the recently published catalogue of the scales and weights in the Museo de las Ferias in Medina del Campo⁸.

A typical example is shown in Fig.5, probably the very same Houben's 8 Reales weight reproduced in EQM at page 1818: it has Spanish marks and English pennyweights on it, plus the mark 8 R (8 Reales) that could be either Spanish or English.

To better understand the origin of this sort of weights one has to check whether all the marks were stamped at the same time or not. A closer look of a fairly consistent number of pieces evidences that the pennyweight value and the Reales mark are stamped on the pre-existing Spanish marks and are therefore later.

This two stage stamping could be explained by the possibility that some weights manufactured and verified in Spain were exported to the Spanish overseas colonies (Sevilla was the port of trade for Spanish American colonies); once there some of them would follow the same way of the silver Reales and end up in the British colonies, where probably they would be stamped with the pennyweight value.

Notes & References

1. I am indebted to Antonio Roma Valdés for the information concerning Spanish marks.
2. According to Mateu y Llopis "Catalogo de los ponderales monetarios del Museo Arqueológico Nacional", Madrid 1934, page 133, the mark oo indicates the value of 2 and 1/2 Reales for gold and 10 maravedis for silver.
3. See the Walter Phillips box n. 105 in G. Zavattoni "Bilance e strumenti per pesare le monete (metà XVII-XIX secolo) da una collezione privata" Milan 2003; I am indebted to Diana Crawford Hitchens for the information concerning the English origin of the shagreen boxes.
4. Another box with a similar Pedro Miguel label but of 1781, with scales with the same "lantern" pointer, was sold in the eighties by SBG in Switzerland. It is rectangular and contains four round knobbed weights and four fractional weights.
5. See Diana Crawford - Hitchens "English Colonial Scales" EQM pages 1778/1785).
6. In another label Pedro Miguel qualifies himself as "Artifice de Pesos y Romanas" (maker of weights and steelyards)
see Mateu y Llopis, , page 134
7. see Mateu y Llopis, page 134
8. Fernando Ramon González, "Catalogo de Balanzas Cajas de Cambista y Ponderales", Medina del Campo 2003, page 43.



Fig. 5 >> Peso 8 Reales Hortyz.

Waterlow & Sons

BY DAVID W H THOMAS

with a pictorial comparison between their catalogues and reality

Sydney H Waterlow started his career as an ordinary apprentice, bound in 1834 to his uncle, Thomas Harrison, the Government's printer. In 1844 he and his brothers added a printing department to their father's stationery business, (established in 1811) which then supplied printing and stationery to railway companies and law offices very profitably. He embarked on his public career when he was 41 in 1863.¹ Knighted in 1867, Sir Sydney later became the first managing director when the company became Limited in 1876. It is difficult to imagine how he fitted all his philanthropic activities into his busy life.

By studying the 1861 catalogue of Waterlow & Sons we get a glimpse into the business that was, so successfully, to



Figure 1. ▲▲ *Skeleton Balance* as shown in the 1861 catalogue. The serpentine base 10" (250mm) wide is made of flame mahogany. The beam is stamped S MORDAN & Co, LONDON. The stepped weight plate is characteristic of Mordan's design. The weight on the left, for 16 P (16 postages), has been re-stamped 1/2 LB and verified underneath by an inspector of Weights & Measures so that it could be used for trade purposes.

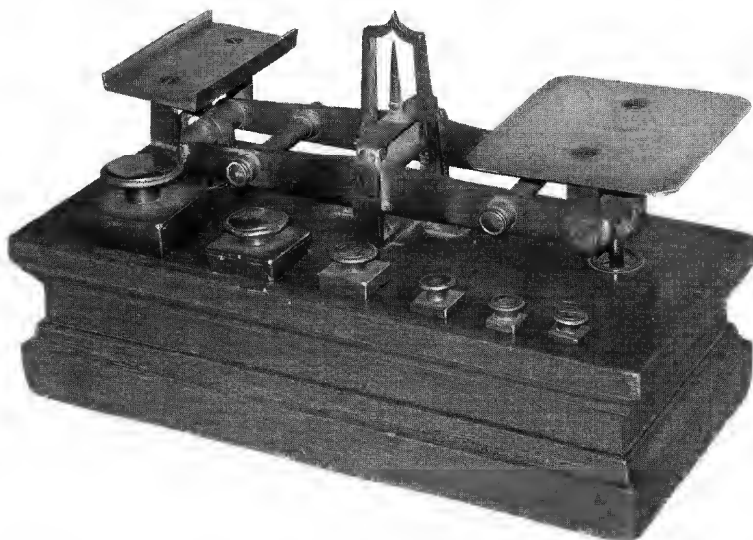


Figure 2. ▲▲ *Improved Balance* as shown in the 1861 catalogue. The example illustrated in the catalogue has seven weights giving a capacity of 16 oz. This is the smallest size advertised, with just six weights giving a capacity of 8 oz. The mahogany case is 8 inches across. The letter plate is stamped J & E RATCLIFF MAKERS. The weights are typical Ratcliff weights with tapered sides and finely knurled knobs. The spacers between the beams are held by very large decorative caps, a feature not seen on the work of other makers.

provide the salary that enabled him to hold so many roles in public life. Waterlows employed a lot of specialists to prepare documents overnight for the law firms, (either by hand or machinery), they sold a huge range of parchments and papers, and all the subsidiary paraphernalia needed in offices, they supplied copying machines (similar to the desk machines made by Mordan) and large copying machines to print from lithographic stones, and they made safes and deed boxes. None of their products was flamboyant or eye-catching. The products were quite plain, and made from the best materials, to attract the business-men in the City of London and Westminster.

They had, in 1861, outlets at 49

POSTAGE BALANCES AND SCALES.

SKELETON BALANCE.

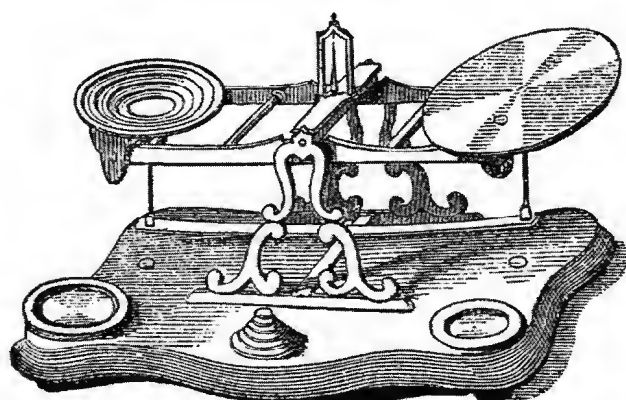


Fig. 72.

To weigh 8 oz.	...	£0 16 0	Plain plinth, 12s.
Do. 16 oz.	...	1 0 0	4 oz. do., 15s.
Do. 2 lb.	...	1 12 0	8s. 6d.

IMPROVED BALANCE.

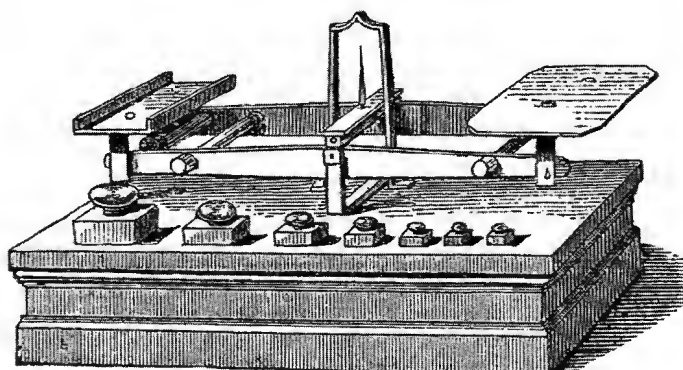


Fig. 74.

To weigh 8 oz.	...	...	...	£0 15 0
Do. 16 oz.	...	...	...	0 18 0
Do., for Deeds and Parcels, to weigh 2lbs.	...	...	...	.1 15 0

Letter Balances for India, with Tola Weights.

SPRING PILLAR BALANCE.

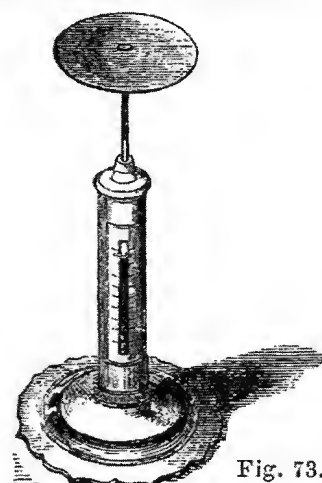


Fig. 73.

4 oz.	...	...	4s. 6d.
8 oz.	...	...	6s. 0d.

BEAM SCALES.

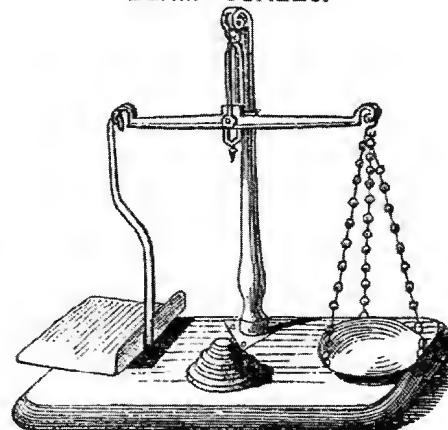


Fig. 75.

To weigh 8 oz. ¹	...	...	12s. 6d. per pair
Do. 16 oz.	...	...	15s. 0d. „
Do. 2 lbs.	...	...	18s. 0d. „

Sovereign Scales, with Royal Mint Weights.

Figure 3. ▲▲ Waterlow & Sons Catalogue of 1861. It is interesting to read the names of these balances: *skeleton balance* for the roberval, *spring pillar* for the candlestick, *Improved balance* for the encased roberval, and *beam scales* for the equal-arm pillar scale. This points up the way that our Society has developed a vocabulary that would not be recognised by any manufacturer or retailer, but does cover scales from many makers and from many countries.

Note the letter balances available to Colonialists to take to India and use there. Note that the sovereign weights were stamped with dies held by the Royal Mint.

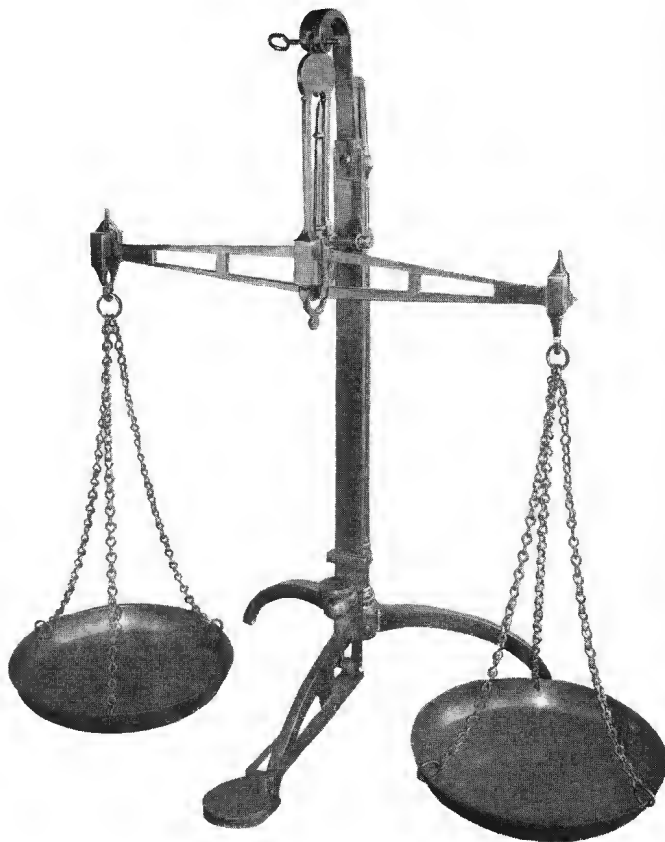
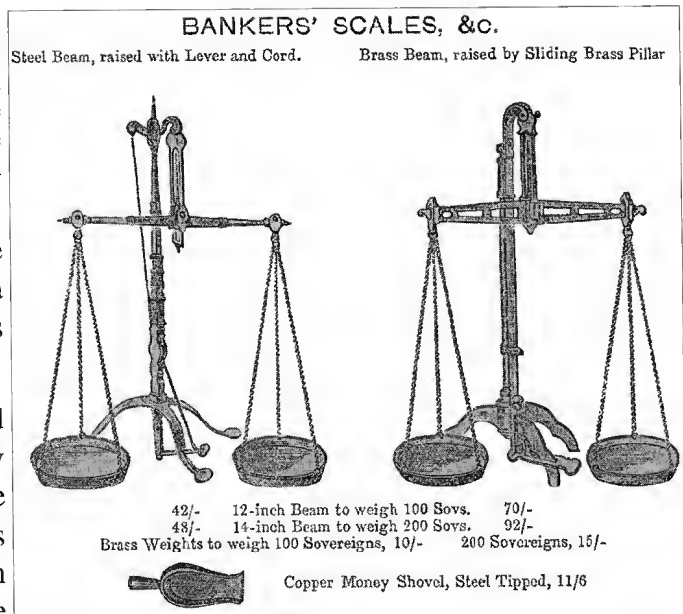
Parliament Street, at 60 and 65 to 68 London Wall, at 24 and 25 Burchin Lane, Cornhill, and at Carpenters' Hall [London Wall] so they were ideally placed to get the business of the top professionals in the largest city in the world. By 1866 they had added premises in Great Winchester Street, by 1872 at Castle Street, Finsbury, by 1875 they invested in the Little Chart Mills at Ashford in Kent, and by 1883 they had expanded to Paris!²

In the comprehensive 1861 catalogue it is the four scales that attract our attention (Figure 3). The first,

Figure 4. >> Waterlow & Sons advertisement in the *Bankers' Almanac* of 1886 and 1890. These scales were much more suitable for weighing coins than the Sovereign Scales shown in 1861. The pans were dished so that the coins could not escape so easily. Both had a lift so that the pans were settled on the table while being loaded. The capacity was usefully indicated in sovereigns.

a 'skeleton balance' is a standard roberval scale made by Mordan (Figure 1). The second is a candlestick probably by Winfield, with its relatively plain design registered in 1840.

The third is an *improved balance* an [encased roberval] with knobbed cube weights probably by J & E Ratcliff (Figure 2). The artist doing the cuts was not good at his job, (omitting the legs going into the base) and might have been intending to draw straight-sided knobbed cube weights. This being the case, Mordans were the only company who made their cube weights with straight sides. Mordan did supply Waterlows with encased robervals, so we are left with two possible makers for this encased roberval.



The fourth scale is called a *sovereign scales*, in spite of the swan-neck ends (less accurate than box-ends), the flat plate and its capacity being described as 8 oz, 16 oz or 2 lb, leaving the customer to decide how many sovereign weights he required. This scale, with the slight bulge at the bottom of the pillar, looks as if it is made by DeGraves, who made such pillars on their GPO scales. In fact the whole scale looks more suited to weighing letters than coins.

If these attributions are correct, these scales were made by the four top makers of these types of scales, Mordan, Winfield, Ratcliff and DeGrave. Waterlows obviously required scales with dignity, strength and reliability so they went to the best makers in London.

Figure 5. << *Bankers' Scale* as shown in the *Bankers' Almanac* of 1886 and 1890. This example has a brass lattice beam 12" (300 mm) long with sharkey beam ends, indicated by having stamped on the beam PATENT AGATE BALANCE.

Behind the gun metal slide is a flat spring curving up with a little roller attached to the free end. This roller presses the slide forwards. The beam is stamped 47437 under the fulcrum. The lever pedal is stamped DEGRAVE & CO LONDON

Postage Balances,

WITH POSTAL RATES ENGRAVED.

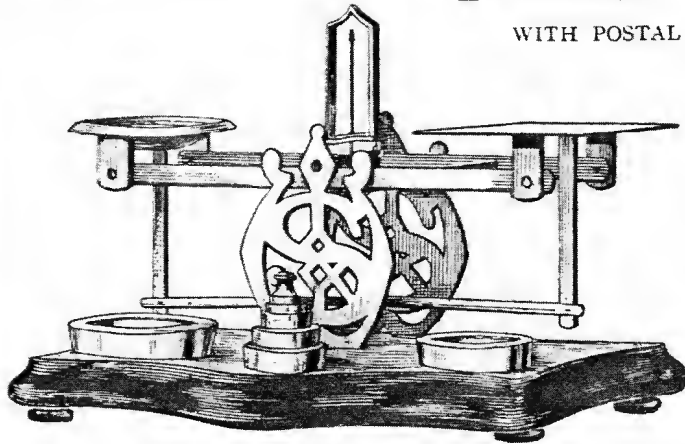


Fig. 177.

Skeleton Balance.

WALNUT OR OAK STAND.

	£	s.	d.
To weigh 8 oz.	0	13	0
„ 16 oz.	0	16	6
„ 32 oz.	1	3	0

Improved Balance.

MAHOGANY STAND.

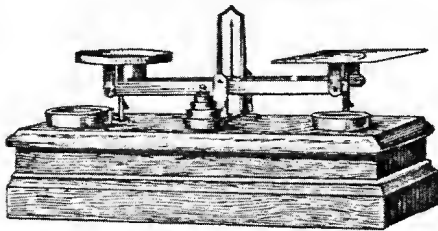


Fig. 178.

	£	s.	d.
To weigh 8 oz.	0	14	0
„ 16 oz.	0	17	6
„ 32 oz.	1	4	0

Plain Plinth Balance.

WALNUT OR OAK STAND.

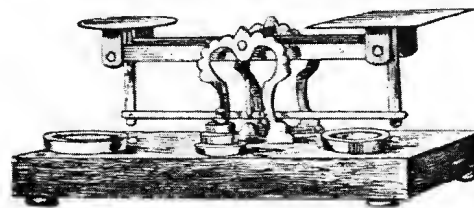


Fig. 179.

	£	s.	d.
To weigh 8 oz.	0	10	6
„ 16 oz.	0	14	0
„ 32 oz.	1	0	0

Extra Weights can be supplied for any of the above at the following prices:
 $\frac{1}{2}$ oz., 6d.; 1 oz., 9d.; 2 oz., 1s.; 4 oz., 1s. 3d.; 8 oz., 1s. 9d.; 16 oz. 2s. 3d. each.

Parcel Post Balances.

OAK STAND.

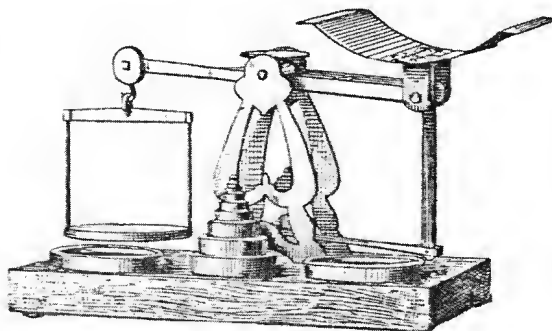


Fig. 180.

With Brass Weights to weigh 12 lbs., £3.

ENAMELLED DIAL.

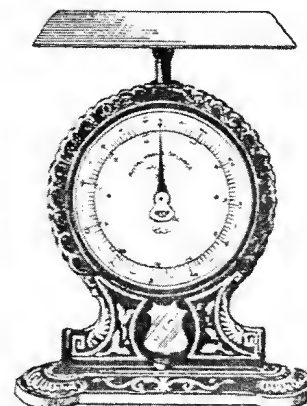


Fig. 181.

	£	s.	d.
11 lbs. x 1 oz.			
4 in. Dial			
5 in. „			

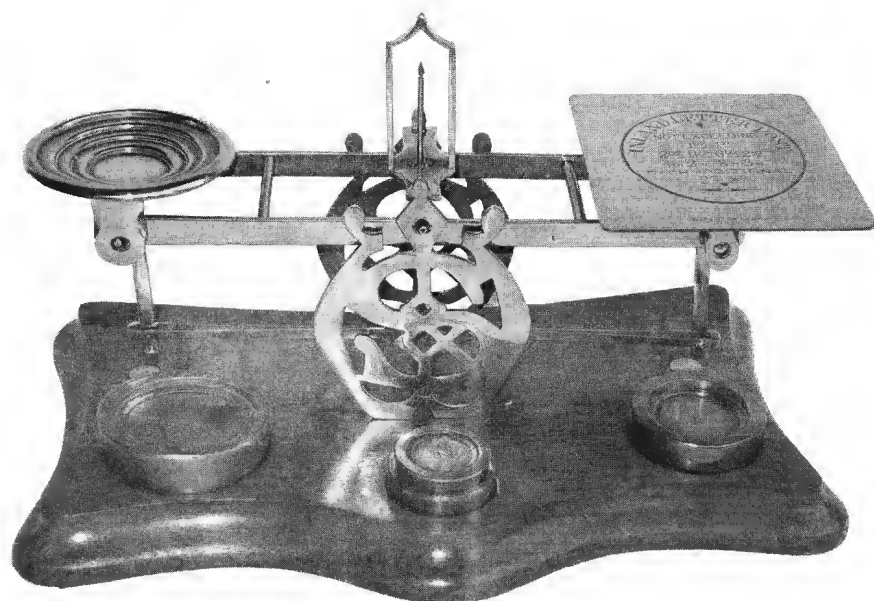


Figure 8. ▲▲ *Skeleton Balance*, as shown in the 1908 catalogue. This example, the biggest capacity, is on a serpentine walnut base 12" (300mm) wide. Stamped on the letter plate, nearest the camera, is WATERLOW & SONS LONDON. This indicates that this scale was made before 1876, before the Company was Limited. The postage rates are 1 oz for 1 D and 2 oz for 1½ D, so the scale was made after 1871. So we can confidently say that Waterlow were having Mordan make scales to their specification, with special "W & S" A-frames by 1876, and still having them made in 1908.

In 1877 Waterlows separated off the business in Birchin Lane to form a new company called Waterlow Bros & Layton. They too patronised Mordans, buying in large roberval parcel scales with their new name WATERLOW BROS. & LAYTON stamped on the beam.

The *Banking Almanac* of 1886 and 1890 had advertisements for Waterlow & Sons Ltd showing a 12 inch equal-arm bright steel bank scale with traditional box-ends, mounted on a pillar with tripod feet, and a cord lift to raise the pans clear of the surface (Figure 4). The advertisements also show a more modern-looking bank scale, a brass equal-arm scale with a lattice beam with sharkey ends (Figure 5). It was mounted on a brass column with tripod feet and a slide lift. It was sold with brass sovereign weights and a copper money shovel. (These shovels had to be reinforced with a steel edge, because the repeated action of digging into piles of sovereigns would have caused a copper edge to wear away very rapidly.³)

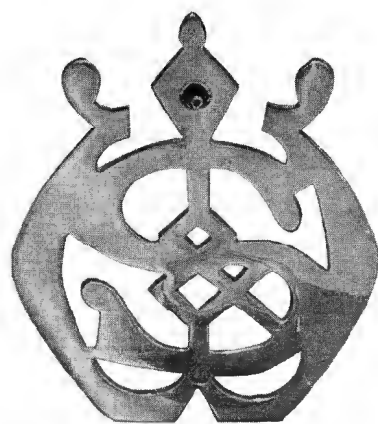


Figure 7. ▲▼ Two of the A-frames made especially for Waterlows by Mordan, formed from a W round an S round an ampersand.



Figure 9. ▼▼ Letter plate on the skeleton balance shown in figure 8. Postal rates for 1871-1897. Note the stamp WATERLOW & SONS LONDON.

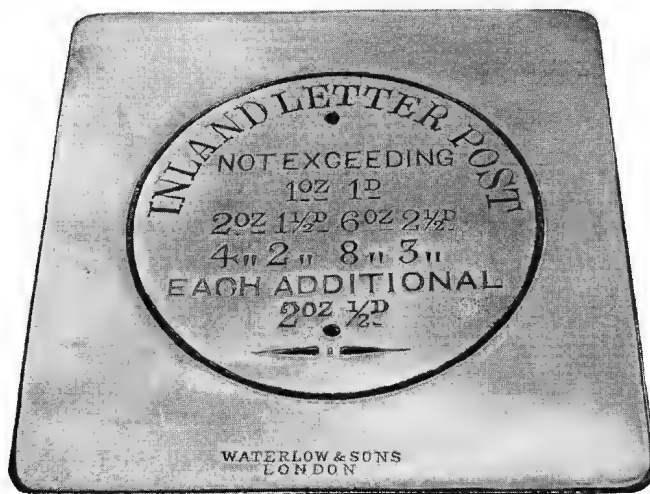


Figure 10. >> *Plain Plinth Balance* as shown in the 1908 catalogue. The oak base is 10" (250 mm) wide. Stamped on the letter plate, nearest the camera, is WATERLOW & SONS L^D LONDON. All brass, but not yet returned to its original bright finish. The postal rates are 4 oz for 1 D, 6oz for 1½ D, 8 oz for 2 D, 10 oz for 2½ D, 12 oz for 3 D, each additional 2oz for ½ D. POSTAL UNION 2½ D PER ½ oz. So this scale was made between 1897 and 1915.

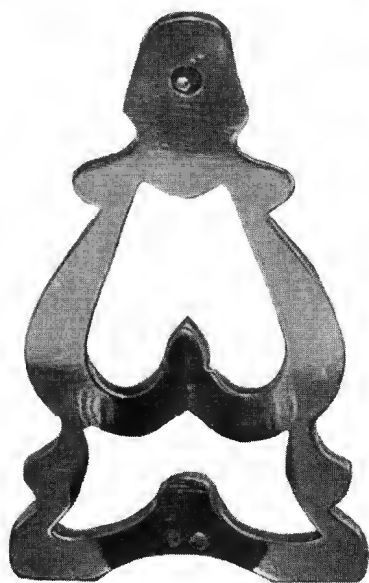
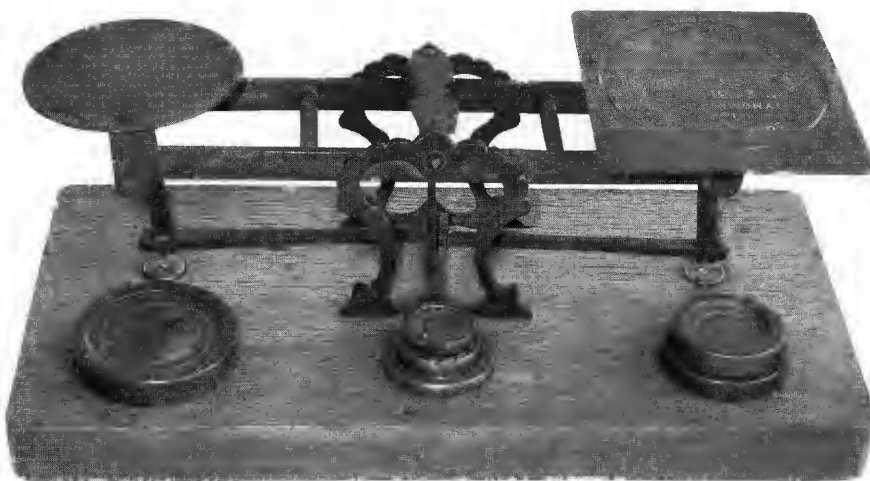


Figure 11. ▲▲ A-frame made by Mordan, but not exclusively for Waterlows.

A Waterlow & Sons Ltd catalogue of 1908 shows many more scales (Figure 6, 14 and 17). They still sold robservals, encased robservals, half-robserval and hanging pan scales and even a dial-face postal scale by Salter, the one maker of spring balances whose scales were approved by inspectors in countries where they refused all other makes of spring balances because of their supposed unreliability. Yet again Waterlows went to the top maker.

The most interesting postals in the 1908 catalogue are the postals that Mordan made specially for Waterlows. [It was the purchase of one of these scales that triggered this article.] Two examples are known: both designs having an A-frame made out of a monogram of W & S. The smaller robserval is still a chunky scale, with a base 12 inches across, as shown in the catalogue.



The half-robserval and hanging pan has a base 15 inches across, and is rugged enough for parcels of 7 lb, the highest capacity permitted between 1884 and 1897. This capacity was obsolete when the 1908

Figure 12. << *Parcel Post Balance with Oak Stand*, as shown in the 1908 catalogue. The base is 15 inches (380 mm) across. This example has a capacity of 7 lb only, but later examples were made with a capacity of 11 lb or 12 lb. Note that the weights are the shape used only by Mordan, with an inner rim that raises the weight above from rubbing on the area stamped on the weight below. So again, there is evidence that Mordan was making scales for Waterlows.

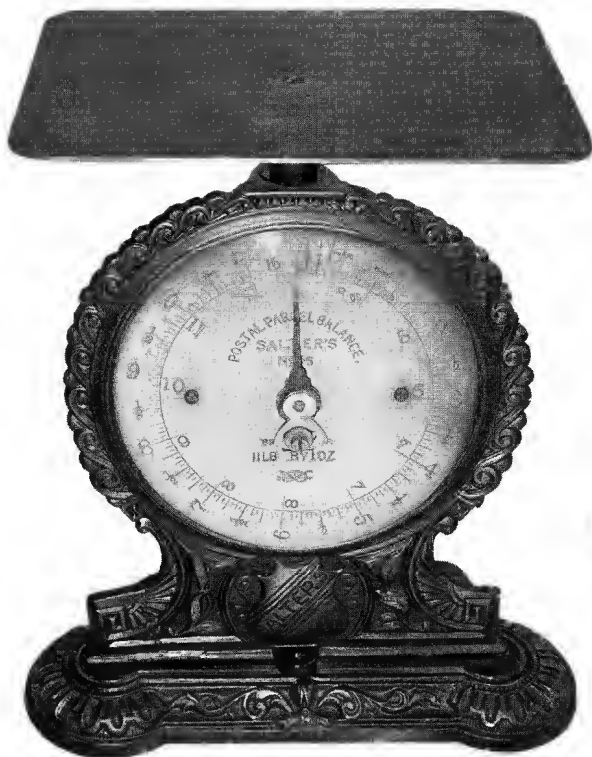


Figure 13. **Parcel Post Balance** with enamelled dial as shown in the 1908 catalogue. This example has the 5 inch (128 mm) brass dial. Salter made this No. 35 design, with its elaborate cast case, for only a short time. The postage rates on this example were in use from 1915-1918 only.



Figure 15. **Silver Checker** as shown in the 1908 catalogue. This example was for checking silver (£100's worth) and copper (£5's worth). It was considerably larger than the postal scale, having a dial 7 inches (175 mm) across. The iron case has an enameled bronze finish, and is screwed to a wooden base. Such scales were used in every bank for speedy checking of the bags of silver brought in by shopkeepers.

Bankers' Scales.

**Japanned and Gilt Iron Pillar,
Best Box-end Beam.**
Raised by Lever and Cord.

Brass
Chains.

Fig. 16.

Hammered
Pans.

Fig. 15.

For use in checking off Silver, loose or in bags; the value of same in £s sterling being indicated on the dial, registering up to £100.
Each 25s.

Brass Pillar, Brass Agate Beam.
Raised by Gun-Metal Lever Slide.

Hammered
Pans.

Fig. 17.

Brass
Chains.

Fig. 18.

10 inch beam, to weigh 50 sovs. 2 0 0
12 inch " " 100 " 2 17 0
14 inch " " 200 " 3 12 6

Copper Money Shovel.

Steel-tipped, ebony handle . each 11 6

Brass Weights.
Flat Sovereign Weights, in sets down to 1/2-Sovereign.

	s.	d.
30 Sovereigns down . per set	7	6
50 " " " "	10	6
100 " " " "	15	6
200 " " " "	22	6

10 inch beam, to weigh 50 sovs. 3 3 0
12 inch " " 100 " 4 0 0
14 inch " " 200 " 4 15 0

Figure 14. **Bankers' Scales** as shown in the 1908 catalogue. Note that the Bankers' Scale with the lattice beam was the same as as that offered in 1886.

catalogue was published. Instead they offered a parcel scale with a 12 lb capacity, with the A-frame shaped almost like the W of the monogram (Figure 11).

The *Improved Balance* [encased roberval] had changed by 1908. No longer was it sold with those chunky knobbed cube weights, that were difficult to make. Instead, it was offered with ordinary round flat weights. The illustrator did not show the distinctive caps on the beam where the brace went across. Poor observation, or a new design?

These scales, too, fit into the idea that Waterlows required scales suitable for the office, not pretty little scales for the home. If one compares these scales with the robervals supplied by Mordan to Howell & James, (see pages 2990-2993) the contrast between dignified and frivolous is striking.

The 1908 catalogue shows more bank scales, available with 10 inch, 12 inch or 14 inch beams with cord lift on a black iron pillar ornamented with a little discreet gilding (Figure 16). They brought in Salter top-pan bullion silver checkers, (Figure 15), for checking bags of coins, and they were still selling the lattice-beam bank scales with a lever-lift. They added to their range very small equal-arm scales and two rod hangers to support little pans with a lever-lift or alternatively, with brass chains on a wooden base, for weighing single sovereigns.

At the bottom of the page Waterlows refer to *Money Balances to test sovereigns and half-sovereigns, in brass, each 3s 6d.* At that price they must have been retailing rockers, as a comparison with the prices in the Avery catalogue of 1906 shows that Avery were selling folding sovereign balances at 16/-, so we can scarcely suppose that Waterlows could sell folding balances at a mere 3/6! Only rockers were that cheap. Were Waterlows selling the P J Maul rockers that Avery sold that were again of the highest quality?

With all those outlets and all those varieties of scales, Waterlows must have sold a lot of scales!

Other scales are known, although never seen in a catalogue, made especially by Mordans for Waterlow. Mordan made a large standard roberval on a 10-inch beech-wood, rounded-cornered



Figure 16. ▲▲ Bankers' Scales with Japanned and Gilt Iron Pillar Best Box End Beam as shown in the 1908 catalogue. The pillar is 13 inches (325 mm) tall. The gilding has been rubbed by years of use. The 'string' is made of cat-gut. This design was in production by Avery from about 1840 until at least 1908.

Balances for weighing Single Gold Coins.

WITH SPECIALLY PREPARED WEIGHTS FOR SOVEREIGNS AND HALF-SOVEREIGNS.

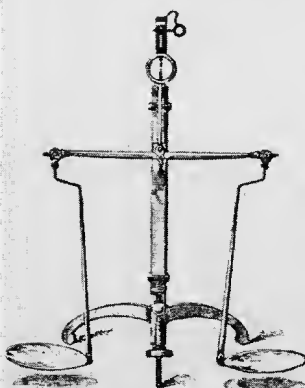


Fig. 19.

Best Quality.

Sliding Pillar on Brass Tripod, or mounted upon Mahogany Stand, £2 17 6 complete with weights.



Fig. 20.

Second Quality.

Brass Sliding Pillar, mounted upon Mahogany Stand, complete with weights. £1 10 0

MONEY BALANCE, to test sovereigns or half-sovereigns, in Brass, each 3s. 6d.

Figure 17. >> Third page from the Waterlow & Sons Ltd catalogue of 1908 (reconfigured to fit EQM). The Best Quality Balance is a very rare design.



Figure 18. ▲➤ This design is not shown in catalogues so far found, but it was made by Mordan for Waterlow. The weights are very unusual. The stack is not a conventional Mordan stack. The largest weight for 2 lb is not original, the 1 lb is original, the 12 oz, the 8 oz, and the 6 oz are replacements, the 4 oz and 2 oz are original, the 1oz, the 1/2 oz and the knobbed 1/2 oz replacements. But they are all Mordan's and they all fit accurately.



Figure 19. ▲▲ The central cast-brass disc over the fulcrum, showing the postage rates current 1883-1886. Most Mordan discs are flat polished brass, engraved not cast. See figure 12.



base with holes for seven weights a-long the front. The weights were stamped 8 oz over 16 P, 4 oz over 8 P, 2 oz over 4 P, [next missing] 1/2 oz over 1 P, [missing, missing] the latter missing weights having been two 1/4 oz weights. WATERLOW & SONS was stamped on the beam.

This little article cannot be considered comprehensive. The time during which Waterlows patronised Mordan cannot be defined. Maybe it was from the beginning of postal scales in 1839, right through to the demise of Mordans in 1940. Could this be possible? Have ISASC members got other scales clearly sold by Waterlows that can extend our knowledge?

Notes & References

1. According to *The Dictionary of National Biography*, S H Waterlow was managing director of Waterlow & Sons Ltd 1877-95, alderman of the City of London 1863-83, originated Industrial Dwellings Ltd [which erected homes for over 30,000 people] 1863, sheriff 1866-7, knighted 1867, Liberal Member of Parliament for Dumfriesshire 1868-9, Lord Mayor of London 1872, Master of Stationers' Company 1872-3, baronet 1873, Liberal MP for Maidstone 1874-80, and Liberal MP for Gravesend 1880-85.
2. Waterlows had several premises, and were highly successful, but do not underestimate the competition they faced from stationers such as Parkins & Gotto of 24-25 Oxford Street, James Perry & Co of London, and Marion & Co of London & Paris.
3. If you find a 'money shovel' without the steel edge, it was for scooping up small amounts of ash in the fireplace!

Biography

David Thomas is a Yorkshireman who was involved in digging Roman archaeological sites round Doncaster in his teens, with Doncaster Museum staff, which has given him a lasting interest in historical artefacts and sites. He has collected coins, stamps and militaria, making good use of his metal detector while he worked for 25 years as a farm manager. His broad knowledge of English history was gained from this practical experience as he liaised with museum staff. His selling of agricultural equipment led eventually to self-employment making ornamental ironwork. His Japanese wife, Hiroko, encouraged him to enhance their kitchen with oak beams with hooks to support all manner of produce and kitchenalia. This led to the purchasing of scales of various types. At an antique fair he met an ISASC member who encouraged him to join the Society. After some fine-tuning, David decided to specialise in Sampson Mordan's scales.

Hanson Scale Company, Part 3

BY STAN HANSSEN

Editors Note: This is the third part of a three part article.

Our Hanson family scale story continues.

During the 1960s, we were approached by an Australian who wanted to manufacture scales. We had a very good distributor in Australia by the name of Peter Marich. Duty into Australia was high, even for scales produced in Ireland. The result of this was a decision to establish Hanson Pty. Ltd to make scales there in a three-way partnership, Marich, Hanssen, & Propert. The scales were to be made in Propert's plant and sales handled by Marich.

In 1968, I bought my aunts' interest in Hanson Scale. This gave me slightly more equity in Hanson Scale than my father. Even though we were doing quite well and growing, there were still differences that could not be reconciled. That's the reason we decided to sell to Sunbeam. I resigned as President. In 1969 we sold our home in Kenilworth, Illinois. This was a very affluent suburb of Chicago where some of the best schools in the US were located. The family moved to Ireland and our two boys enrolled in a local Irish public school. They both received an excellent education at this school.

Now I had a new job. The job was to grow the Irish business. We had a good base from which to grow. Sunbeam had ownership of my US patents so we could not compete in the US for five years. The rest of the world was wide open to sell scales. Another obstacle was Hanson USA owned the strip steel scale patents.

The first thing to do, was to make the Irish factory independent of parts from US Hanson. This was accomplished by installing small presses to make the internal parts. 110 ton and 90 ton presses were also purchased. As kitchen scales were big in Europe, we tooled a kitchen scale and a small diet scale. These new products were successful. Kitchen scales became an important part of the business. Scale parts were sold to the Hanson factory in Australia.



Figure 1 ▲▲ The Sligo, Ireland plant, shown here, was opened on May 9, 1964. The author and his family relocated to Ireland in 1968 enabling him to operate this Hanson Industries Ltd plant. Stan Hanssen was primarily responsible for the international expansion of Hanson Scales. They had agents in Africa, Europe, Asia, South America, North America and Australia.

Trade shows became an important marketing tool for Hanson. The Spring Hardware Fair in Birmingham, England, and the Cologne Housewares Fair in February (later in Frankfurt) were two of the best. Hugo Fischer, who spoke German and French, would come and help at the trade fairs. The fairs presented an excellent opportunity to secure new business and provided a means of enhancing existing customer relationships. In the early days we wrote big orders at these fairs. To help grow the business we opened a sales and marketing office in Dublin and hired a marketing or sales manager. This created some personnel problems with our English distributor McEwen and our plant manager. We set up a distributing company in Germany in 1965. We eventually had to close it in 1971.



Figure 2 ▲▲ Stan Hanssen, the author, shows a bathroom scale to Irish Minister of Trade & Industry Erskine Childers and Sligo's Lord Mayor McGoldrick. Stan holds several patents for bath and other types of scales.

In the late 1960's, we identified a major marketing opportunity for the distribution of wall clocks. The initial designs were not successful and after a period of further development, we successfully reentered the clock market in 1971. We did this under Hanson Industries as a wholly owned subsidiary of Hanson Limited. The clock business became very important.

It was at Cologne that a buyer from UK Green Stamps visited us. Green Stamps proved to be our largest UK customer. When stamps died out, the company created Argus. Argus was a catalog show room operation and was very successful.

During the late 1960's we kept pushing our English distributor, McEwen, to go after more business other than just relying on the British Mail order companies and Green Stamps. He did nothing with clocks. He was great at telling us why he couldn't sell certain accounts. It was then he brought his sons-in-law into the business. This was OK except he made arrangements to sell the German Soehnle and Terraillon scales. His rationale was that we didn't have a product line to compete with them and this would not hurt us. This was not acceptable so we parted company. We didn't lose any business due to our parting company with him.

Because of the companies inability to find good

Figure 3 >▼ 1970s Kitchen scales like this wall scale were an important part of the European home. This scale was made of bright orange plastic with a black dial and red-orange numerals.

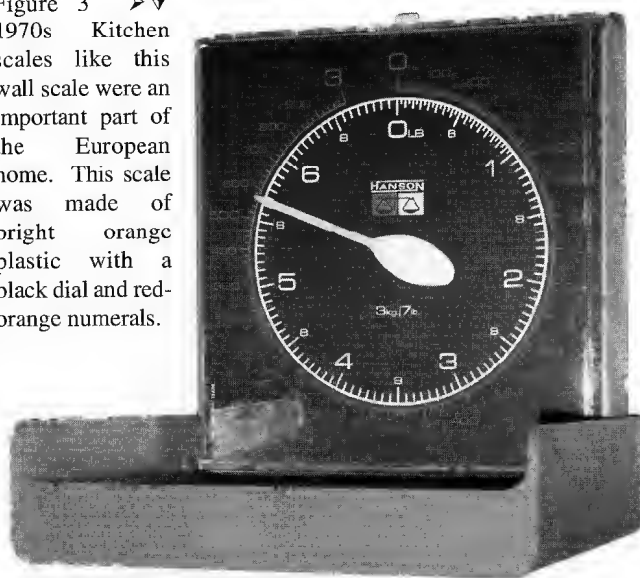




Figure 4 ▲▲ Bath scales manufactured by Hanson Industries Ltd were shown in their 1988 catalog. These mechanical bath scales were guaranteed for 5 years. Electronic bath scales shown in the same catalog were guaranteed for only one year. These Model 831-833 were gray & white while model 834 was white with a blue, yellow and red stripe.

was run as a division of Hanson Limited. Eric Hanssen, after returning from a round the world trip, took over as production manager. It experienced trading difficulties and was affected by industrial relation problems at Hanson Industries. It was decided, in view of the problems, to close the operation. The trade and assets of the division were traded to a third party. The third party controlled a building company and the offset was an addition to the main Hanson factory.

In December 1979, Jim Hanssen joined the company after working three years as a field engineer for Factory Mutual System, a fire insurance company. It was at this time that the English sales manager and the manager of the clock company decided to go off on their own and set up a competitive clock business. They were assisted in this by our Swiss supplier of clock movements. Their clocks were copies of ours. We took them to court on the basis of copyright in the UK. They were forced to destroy their literature and modify their designs. This competitive company tried to steal our sales force and were partially successful. They also tried to buy clock movements from other suppliers in Japan and Germany. We dropped the German supplier and convinced the Japanese company to stick with us. We fought them on the market place and held our own. In early 1985 they fell out with their

suppliers for scale dials and clock faces, Tellits Dials was setup as a wholly owned subsidiary of Hanson Limited in 1972. This was located in Alcester, England and run as an independent operation. It supplied dials and parts to other companies including competitors of Hanson. In September 1988 it was sold to the managers. It was decided Tellits no longer formed part of the core activities of Hanson. A supply agreement was made with Tellits as part of the sales agreement.

We set up our own sales organization in the UK operating out of the same premises as Tellits. This eventually proved too small so we built an office and warehouse. We closed the Dublin sales office and located our marketing office in the new UK premises.

In 1976 a French company Hanson S.A. was established. This manufacturing plant was to overcome the restrictive French laws governing the importation of bath scales. Unfortunately we never could overcome the legal specifications, which would permit the sale of bath scales in France. We did sell to other countries but eventually had to close the operation in 1978. The machinery and tooling were transferred to Ireland.

In 1979 a production facility to manufacture stepstools was established in Sligo. The operation

Swiss partner and the Irish partner suddenly died. The wife of the Irish partner tried to run the company but eventually sold the assets to us.

During this period until 1983, we had our injection molding plant in the main factory. The mold shop was operating on a 24 hour a day basis. This posed difficulties in terms of supervision, particularly for the night shift. It was decided to close down the operation as the need for molded parts could be more efficiently met by outside sourcing. The molding machines were sold to Lough Gill Plastics, set up by the former employees and the manager of Hanson's plastic division. Lough Gill became a supplier until it was later placed in liquidation.

We were also selling clocks in France. This part of the business was transferred to Rouen. It was managed by the former Hanson S.A. sales manger. We acted as a distributor for the German clock firm Haller Sarl. By July 1987 80% of the sales were Haller products so we sold the company to Haller.

It was then decided to move the clock operation from its premise, which was sold, to the space occupied by the molding shop. This move created labor problems as the material handlers said it was more difficult to handle clock cases than scale cases. Rather than bow to this demand, it was decided to move the clock division to the new UK office and warehouse in Alcester. This worked out extremely well as the greater percentage of the clock divisions sales were in the UK. This meant that only scales were being made in Ireland.

In 1980, my wife and I decided to move back to the US. The weather and the constant turmoil of labor problems caused by a group of four employees made this decision easy. Jim Hanssen wanted to stay and run the business. He was made managing director, decided to move to England and operate the business from the UK offices and clock factory. A manager had been brought in to run the Irish factory. Eric Hanssen decided to move to the US with us and we located in Las Cruces, NM.

During this period Detecto, a major US producer of bath scales, had gone into liquidation. The bath scale division was bought by Spegal Bogine a division of Beatrice Foods. They needed a scale source and came to us. It was then that Eric and I, with a 100,000 scale order from Beatrice; decided to set up in Las Cruces, NM to make Detecto scales. A 17,000 sq ft plant was built and a 110 ton press bought. A very modern powder finishing plant, large enough to handle growth, was installed. The start of a sales force was organized to sell under the name of Metro. In the beginning the majority of sales were through the private-label agreement under which Metro produced the Detecto scales. Hugo Fischer's son, another Hugo, joined us as our first employee. Through the years, every time I had lunch with Hugo, I would think about all the lunches and meetings I had had with his father.

Things were going well until 1985 when a personal family disaster struck. Jim Hanssen suddenly died of an asthma attack in August 1985. He was only 32. Not only did we have to live with our personal anguish; Jim's death left a big hole in our European operation.



Figure 5 ▲▲ This style of kitchen scale was new in Hanson's 1988 catalog.

All of a sudden we had two businesses that were in trouble. The initial Metro sales force was a disaster and the UK and Irish business needed day-to-day management. In 1985 Counselor scale bought the Detecto business. This terminated the bulk of Metro's business.

As Eric and I were now living in Las Cruces, we had the problem of managing an overseas business. This meant more overseas traveling. Eric and I resolved to keep the business and try to find a qualified managing director to run the business. Jim had hired some good people but they needed direction. We had the good luck to find a very competent managing director. This was an Englishman by the name of Phil Brand. He had served on our board as a representative of Sunbeam who had 10% of the Hanson Ltd. shares. Phil was well acquainted with the English market having been the managing director of Rima, a Sunbeam company. After Rima was closed with other English Sunbeam companies, Phil took a job with another company. This did not offer him a challenge, so he was happy to join Hanson as managing director.

Phil's challenge was two fold. The first was to motivate the Hanson staff. The second was to grow the company so it could go public or perhaps be sold. Phil was a professional and the timing of his becoming managing director was good. Sales increased, as did profits. In preparing the company to go public, we felt it would be best to buy out the minority stockholders, this was accomplished.

With the Hanson European operation under control, Eric and I had to get Metro going. The sales problem was attacked by hard work and the volume increased. By 1988 Metro's volume was greater than it had been with the Detecto business. An addition to the factory was made in July 1987.

We got a listing in Wal-Mart in an interesting way. Eric learned that Sam Walton was going to visit their new Las Cruces store. Eric went over to the Wal-Mart store and located Mr. Walton at a phone booth. When Mr. Walton saw Eric he asked him what he did. Eric said "I make bath scales here in Las Cruces and I want to sell Wal-Mart". Shortly thereafter, Eric received a call from the Wal-Mart buyer and Metro was listed."

In Europe things were going well and preparations were made to list the company on the Dublin stock exchange. We even bought out Hollands & Blair, the English company that made the Spiralox scale. Then the French scale company Terraillon came along and made an offer to buy us that we couldn't refuse. They were concerned about 1992 when common market rules would abolish their restrictive regulations. Terraillon was a high cost producer and Hanson was a low cost producer. The sale was made in March 1989.

In the US Metro continued to grow. New models were introduced. A line of hanging scales were designed and manufactured. Electronic digital scales were made and some imported. A large dial professional type scale was designed and introduced. A marketing consultant was hired to consult on how to improve the companies marketing. The company continued to grow. In 1990 the factory was expanded by another 10,000 square feet. More expansion occurred in 1992/1993 increasing the size to 55,000 square feet.

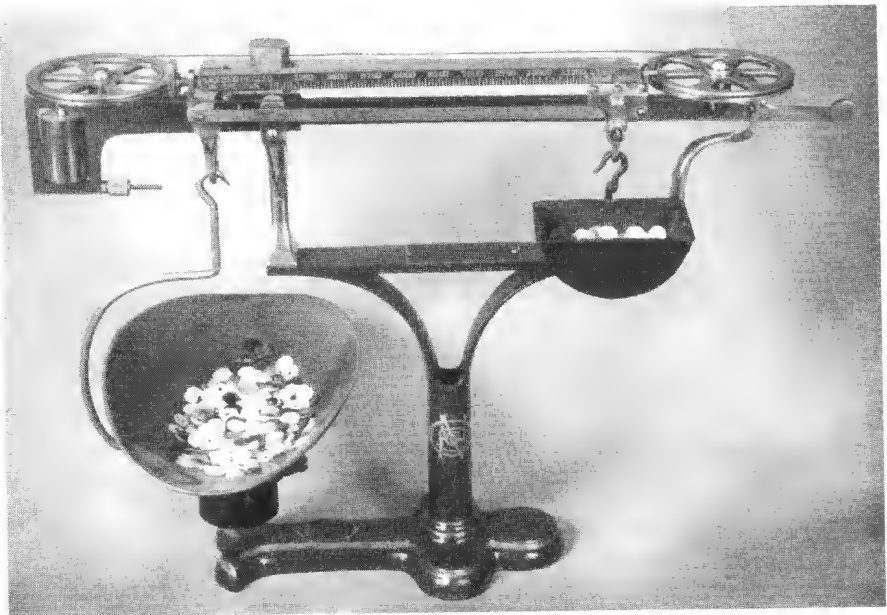
In early 1997, a group calling themselves Taylor Precision Products approached the company with intent to buy a scale business. The partners of Taylor, with a bank, had been some of the owners of Health-O-Meter scale, which had been sold to Mr. Coffee. They wanted to get back in the scale business. Negotiations commenced and a deal was struck. Metro was sold to the partnership in

September 1997. Eric Hanssen stayed with the partnership for one year under contract. I resigned in September 1997. A 30,000 square foot warehouse was built as part of the sales agreement.

There is an epilogue to all of this. There were many changes in the US scale market. Mr. Coffee had acquired Health-O-Meter and eventually Mr. Coffee was sold to Sunbeam. Sunbeam ended up owning most all the scale brand names including Hanson, Detecto, Borg and Counselor. Sunbeam later went through a bankruptcy and their scale business lost direction. Taylor/Metro took advantage of Sunbeams lack of direction. Taylor/Metro grew very rapidly. In the summer of 2002 the Taylor partnership sold the company to Ho-Medic a distributor of personal healthcare and wellness products. Metro continues to manufacture bath scales in Las Cruces but imports many digital scales from China. It is interesting to note that most all the mechanical and some digital scales manufactured in China are based on the strip lever patents of Hanson.

Showcase

Patent number 659,830, for this unusual scale, was issued to W H Sanderson on October 16, 1900. The patent was assigned to the National Computing Scale Co. of Cleveland, Ohio but this counting scale was manufactured by the National Scale Co. in Chicopee Falls, Massachusetts. It is probably the most desired counting scale to be produced in the USA. This striking scale is made from brass, steel and original deep red painted cast iron with gold highlights.



There is an engraved metal plate, attached to the scale, which reads as follows: *Method of Testing Ratio Pan: Care should be taken so that ratio pans are of the correct weight when ratio pan is at zero. The machine should balance. If not, balance by balance ball. Run the ratio pan out to full extent on trolley bar and machine should still be in the same balance as at zero. If either too light or too heavy, adjust ratio pan by means of adding shot to shot cup at bottom of pan.*

There is a shot cup riveted in the bottom of the smaller pan. There is a screw in the bottom of the pan that can be removed to adjust the shot. Shot can also be added to the bottom of the holder for the larger pan.

The computing beam has four sides and rotates easily. By placing a given number of items in the smaller pan the user can count a set number of like items by placing them in the large pan until balance is achieved.

Ed Konowitz collection

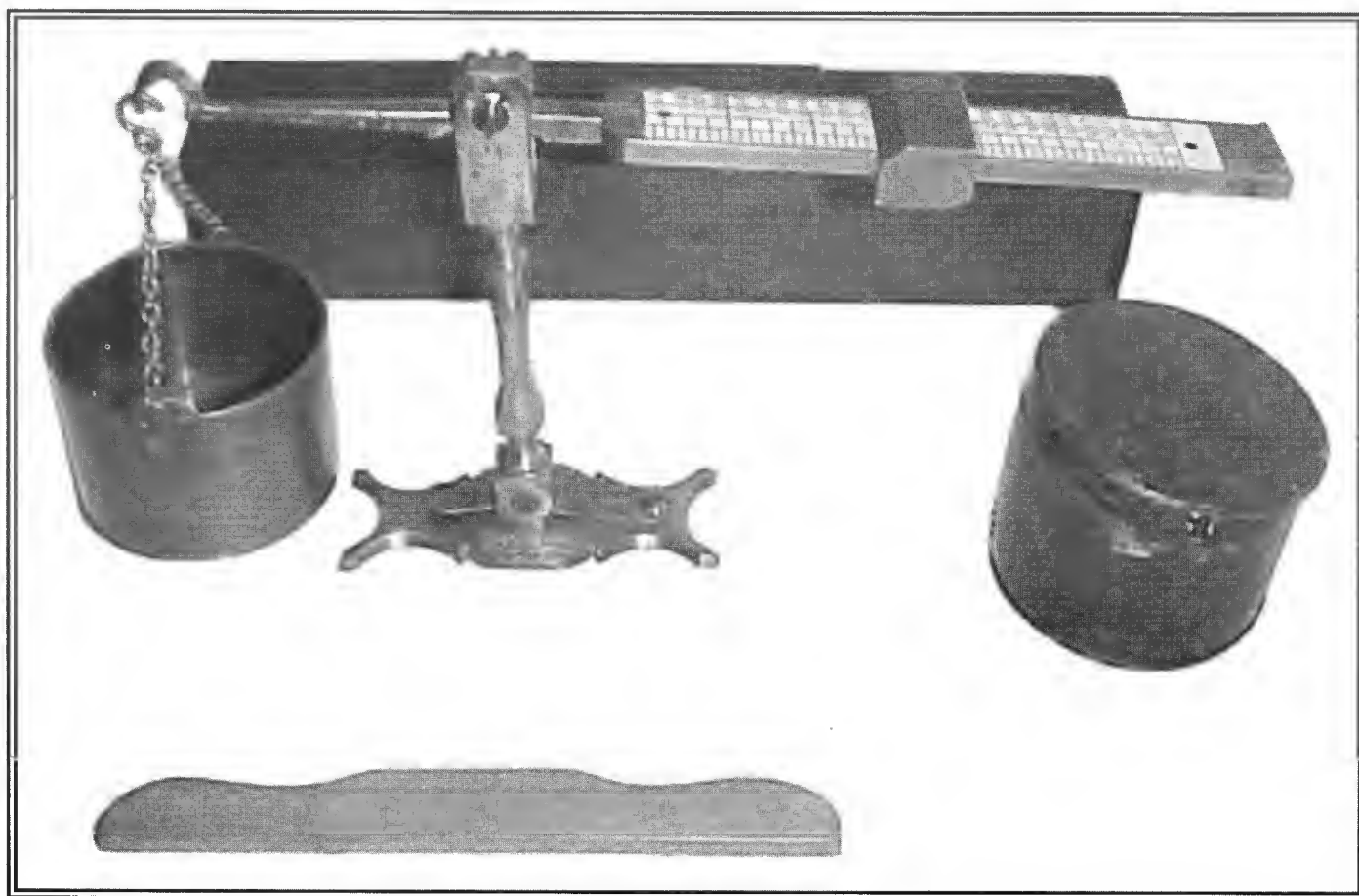


EQUILIBRIUM

QUARTERLY MAGAZINE OF THE INTERNATIONAL SOCIETY OF ANTIQUE SCALE COLLECTORS

2005 ISSUE NO. 2

PAGES 3013 - 3040



Cover Picture

This is a small grain or perhaps more accurately a seed scale. This scale is contained in a wooden box 8³/₈" by 1¹/₂" by 1¹/₂". The cup is contained in a tin container 2¹/₄" in diameter. The scale is of 3 parts:

1. A brass post 4¹/₈" high on a brass base which is engraved *W. Packer Inventor*. The brass base holds the fold down post. The post is held upright with a spring. When in upright position will hold the ivory inlaid arm.

2. The ivory inlaid arm. The arm is 7⁷/₈" long and ³/₄" wide

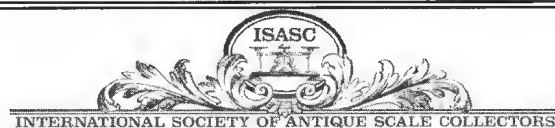
3. A brass seed or grain cup which is 2" in Diameter and 1¹/₂" high.

The Ivory inlay in the arm is numbered 100 to 304. The seed cup is attached to the arm with fine jack chain. I believe the scale to be English. A small rectangular wooden striker is included.

Les Firth Collection.

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Depressed Tourist Turns Expert

BY CHARLES SAIT

On the top shelf of a cabinet on the top floor of a room at the Historical Museum of New York there is a boxed set of hand-held scales made by Freeman of Bartholomew Lane, London. I had discovered them on a previous visit to the museum but had difficulty seeing inside the box clearly owing to the somewhat lofty position in the display cabinet and my own reliance on varifocal lenses. Short of breaking into the cabinet, therefore, a proper view of the item was impossible. A member of staff was on hand, doubtless to prevent any such burglary, but at least he was able to supply me with a short write-up along with a fuzzy photograph from the computer. I promised myself a further visit to see if I could get a better picture with my own camera, provided someone could open the cabinet for me. This visit occurred, recently on a very wet New York day. My photographic ambitions were, immediately thwarted by a 'no photograph' rule but I figured that, as they had already photographed it, they should have the negative from which a clearer picture could be obtained?

It was obvious that this was something they got asked frequently, and I was given notes on how to proceed. The first thing I noticed was the exorbitant prices they charged for getting photographs for items in their collection. They were too high for me and I pondered, ruefully, about how much had been paid to the Native Americans, all those years ago, for that desirable piece of real estate that is now New York.

Experience has taught me that if it is raining it is better to go somewhere where it is dry, so I headed for the Metropolitan Museum on the other side of Central Park. On previous visits to this venerable institution I had seen another fine boxed set of scales, and I knew they had a less prescriptive attitude to non-flash photography. This suited me ideally as I have not yet figured out how to work the flash on my camera, with any reliability, anyway. Upon arrival at the Metropolitan Museum I headed for the area where I knew the scales to be located, just to the right of the main, very crowded entrance hall. Imagine my horror when I found them gone! The whole area had changed since my last visit. Working along the line of staff did not throw up any light on where they might be. On this occasion, no one had heard of or seen them so it looked as yet again I was going to be thwarted in my search.

At this point I should mention that whenever my wife and I have time to go out together we usually split up; she heads for the art galleries and I go to anywhere where I can look at weights and scales; a practice that has been known to lead to un-chaperoned purchases from time to time. On this day we met in the Met. She was the one in the party being shown some of the exotic pictures that this prestigious museum is famous for and I was, by now, the very dejected one who was ready to kill for a cup of coffee.

I could see she was excited as she pulled me into a corner at the end of her tour to introduce me to the guide. The reason for the excitement was that, when describing a painting called *A Goldsmith in His Shop* by Petrus Christus, to this group, the very knowledgeable guide had said that the brass pot on the table in front of the sitting goldsmith was a crucible for melting gold. Pat told her that she was sure it was a set of nesting weights. She added that her husband was an expert in these matters and so I was introduced to the group. It was immediately obvious that the item in question was a set of nesting weights. I pointed this out and even drew attention to the two single weights on the table

beside the main set. The guide was suitably grateful for this bit of ritual humiliation but at least took the information on board for the future.

There are three points I would like to make here.

a) You can look at the picture by logging on to:
http://www.metmuseum.org/toah/ho/08/euwl/ho_1975.1.110.htm

Alternatively go and see the picture for yourself, preferably on a guided tour (this could well be the easier option for the 'IT challenged').

b) This information will be added to any future tours the museum arranges which will at least correct an area of erstwhile misinformation.

c) The puzzle to me is how on earth did my wife know what a set of nesting weights was?

Bartholomew Lane, London

BY DIANA CRAWFORTH-HITCHINS

Just behind the Bank of England, in the heart of the City of London, runs a short lane which used to

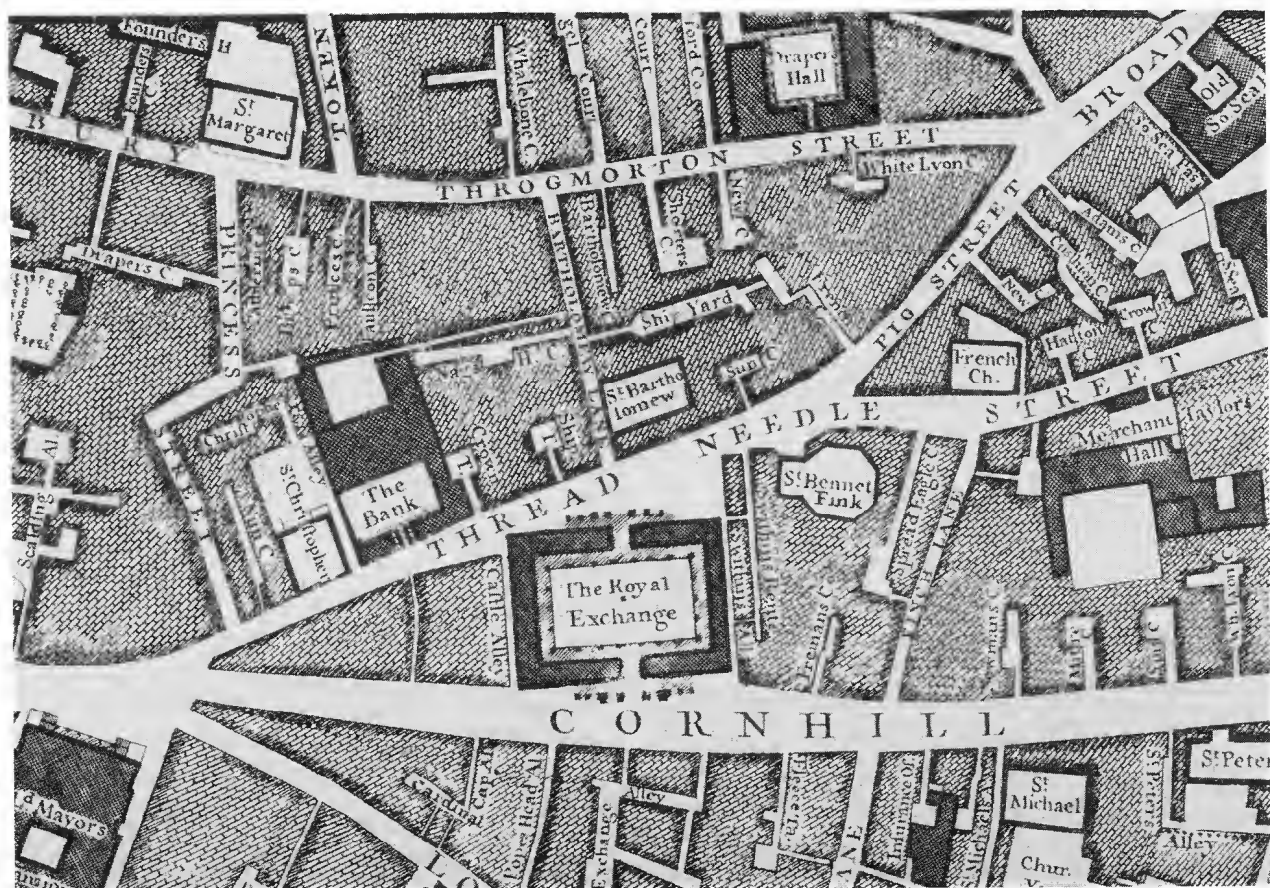


Figure 1. ^^ Bartholomew Lane goes north from the Royal Exchange. Note Founders' Hall in the north-west corner, where Founders' Company had their Courts, their meetings and discussed doing searches for false weights.



Figure 2. << A very badly damaged trade card of Henry Neale. The Justice and Scales is just visible on the left. Note that Justice is blindfold, and carries a sword in her right hand, and scales in her left hand. On the right-hand side are the reminders that life has a finite end (the hour-glass) and that death (the skeleton) will come eventually. In the centre is the remnant of the label "Henry Neale at the End of St. Bartholomew-Lane, near the Royall Exchange, London" with Henry Neale's personal mark, the Hammer and Crown with HN. The Royal Arms implies that Henry Neale was Scale-maker to the King.

have about 30 houses along it, going between Threadneedle Street and Throgmorton Street. In the 17th and 18th century it was narrow and dark, but had the great advantage of being near the Bank and the Royal Exchange, where rich merchants, both English and alien,¹ conducted their business. Because we had recorded so many scale-makers working in Bartholomew Lane, we assumed that every other shop was a scale-maker's.



Figure 3. ^^ Thomas Overing at the Angel and Scales. Note that the Angel carries a palm frond in her right hand, is not blindfold and has wings.

Figure 4. >> Walter Phillips at the Angel and Scales. The Angel has one breast exposed, a common detail in the first half of the 18th century. Stilliard is still spelled the old way. The border design is typical of borders drawn before 1720. This trade card was in a box of scales made for the Spanish market.



But even the briefest study of the shops reveals that only three shops were mentioned, the Justice & Scales, the Hand & Scales and the Angel & Scales. As it would be ridiculous to think of two shops in one short lane having the same name, the presumption must be that there were only three scale-makers' shops. In parenthesis, one scale-maker, Michael Bayley, did not give his shop sign, perhaps because he was earlier than the others, and if he was the first or the only one, he didn't need to say which scale-maker's shop he was in - it would be obvious!

By dating the period when the scale-makers were there, we get a fuzzy picture of who was neighbour of whom. (Table on page 3019). By studying the dates some overlapping becomes apparent. Why? Were there independent scalemakers sharing the same shop? Have surviving labels given us the impression that one scale-maker was always at the Angel & Scales, when in reality, he lived there for only part of his working life?



Figure 5. ^^^ William Newton & Co at the Hand and Scales. Although the writing looks like "Nenton", it is actually Newton, written in the style used around 1730-1750. Note the new mid-1700s spelling of Steelyard. As the Hand & Scales is opposite the Church, they were at the south-west end of the Lane.

<u>Unknown shop sign</u>		<u>Angel & Scales</u>	
Michael Bayley	1672-1674	Timothy Roberts	c.1693-1731, trained son Richard
<u>Justice & Scales</u>		Walter Phillips	c.1701-1719
Henry Neale	1686-1702	Thomas Overing	c.1716-dead 1731, trained William Newton
Henry Neale Franting	?, after Henry Neale	Samuel Freeman	?, possibly 1741-1752
<u>Hand & Scales</u>		Timothy Roberts & Son	1731-1735, [Timothy died after 1744]
William Newton	1729-dead 1761	Richard Roberts	1735-1749
William Newton & Co	?		

This is not the only evidence that suggests that more than one maker was at the same London address at the same time. But it is difficult to imagine what happened when a customer walked in the door. Did the scalemakers have an arrangement whereby they took it in turns to approach the customer? We know that the scale-makers at the Angel & Scales were making the same type of scales, both coin and diamond, so one envisions the customer wavering between two virtually identical scales made by two scale-makers. All very odd.

Acknowledgements

With thanks to Charles Sait for the information that Samuel Freeman had a shop in Bartholomew Lane.

Notes & References

1. Alien then meant "from abroad". We would say "foreigner", but they would have taken that to mean "from outside London".

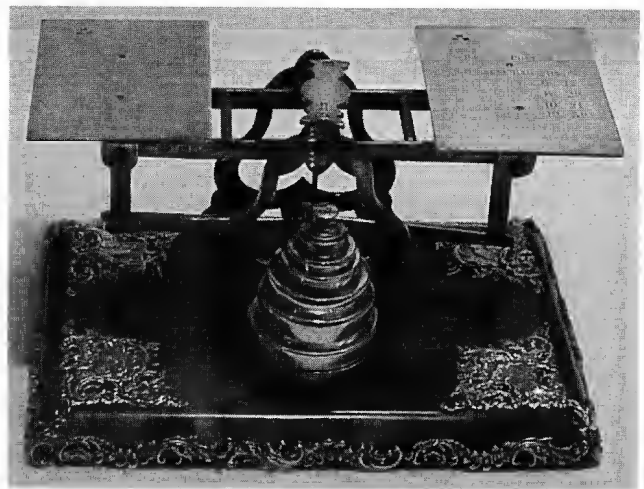
Showcase

Fig. 1 ♡♡ This gold scale is inscribed "JOS. W. FARNUM M.D. EX. ASSAYER. U.S. MINT". Joseph W. Farnum was the first assayer-melter at the U. S. Mint in Dahlonega, Georgia. He sold Mint sweepings in London in 1854 and moved to the San Francisco, California area in the 1850s or 1860s. Clem Monday collection.



Fig. 2 >> This sterling and tortoise shell roberval letter scale by S Mordan & Co is one of their most magnificent creations, made between 1871-1897.

Dick Axelrood collection.



Webster Scale

Editor's note: *This article is reprinted from the May 1957 issue of The American Rifleman. Chain and oil dash-pot speed up the weighing of powder*

The Webster Scale Manufacturing Co., P. O. Box 718-R, Sebring, Fla., has sent us a sample of their latest 360-gr. capacity powder scale for handloaders, which they call their Model RWC. The letter W in this designation indicates that the scale has self-contained weights, and the letter C means that it uses a chain for the purpose of making fine adjustments.

The use of a chain for adding or subtracting small increments of weight is highly desirable and convenient. Such a system, under the name Chain-O-Matic, is used with some high-grade laboratory balances, and takes a large part of the drudgery from weighing with such balances.

One end of the chain is attached to a pin projecting out from the axis of the scale, in a direction parallel to the beam, and the other end is attached to a slider on a vertical strip which is graduated in divisions each representing $\frac{1}{20}$ of a grain. By means of a thumb screw, 2 sprocket wheels, and a sprocket chain, the slider can be moved up and down the vertical index strip.

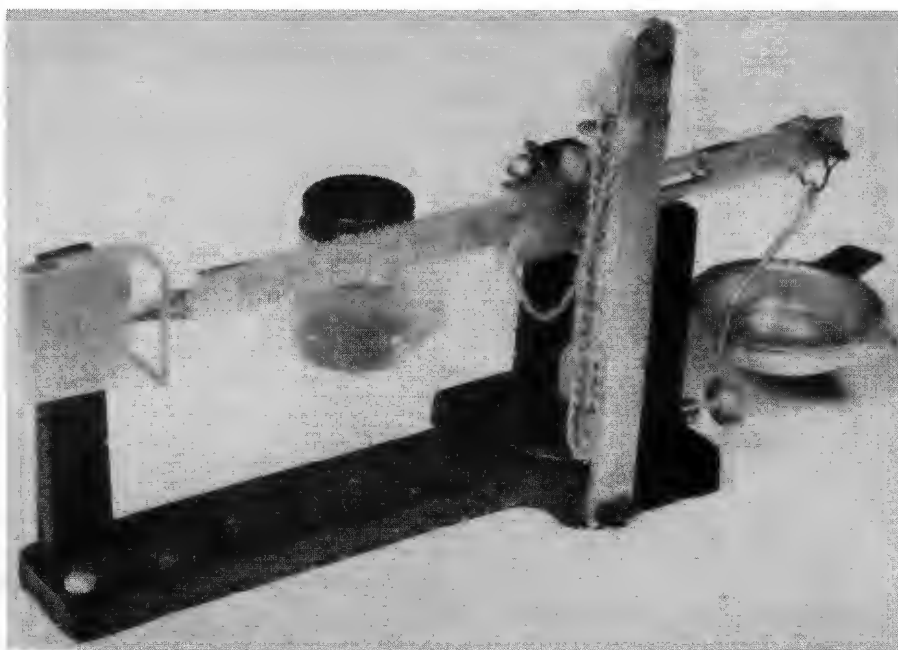
To speed up weighing, this scale is fitted with a dash-pot to damp the vibrations of the scale beam. This is a small wide-mouth bottle of oil, into which a paddle projects downward from under the center of the scale axis.

With the oil dash-pot in place, the point of the beam follows the motion of the chain thumb-screw almost as though the screw were working directly on the beam itself instead of on the chain. Weighing by this system is exceptionally convenient, and very accurate. We ran some tests by weighing standard weights running from $\frac{1}{2}$ gram (7.72 grs.) up to 20 grams (over 300 grs.) and found the error with the 1 gram (15.43-grs.) weight to be only .006 gr. and with the big 20-gram (308.64 grs.) weight to be only .035 gr. This is extremely good.

Each time the scale is used, the oil dashpot should be removed and closed immediately afterward, and the paddle wiped off carefully, to avoid the accumulation of dust and the capillary creeping of oil which must not be allowed to reach the knife edges.

This very fine and convenient scale sells for \$26.50.-NRA TECH. STAFF

Webster retains its headquarters in Sebring, FL. Production of this powder scale was discontinued about 35 years ago.



Howell & James Revisited

BY KEN GOVIER

Andrew Crawford's excellent article in Issue 1 of EQM 2005 (page 2990-2993) revealed some interesting design features of scales made by Mordan for Howell and James. Of particular interest to me was the reference Andrew made to the design of the A frame and the extended pan legs as illustrated in Fig 4 (page 2991) of Andrew's article.

Some two years ago I acquired a similar scale (figure 1) made by Mordan for Howell and James, it differed only in respect of the base which on my version was brass embellished with a champeve finish. My version also sported the puzzling extended pan legs that Andrew referred to and inspired by his reminder I felt impelled to investigate further.



Figure 1 ▲▲ This scale needs to be seen in colour! The enamel is vivid blue, white, red and green with brass borders..

Comparing a number of Mordan scales it eventually became clear that these leg extensions related to the mounting position of the bottom bracket linking the two A frames. This bracket also provides the point of linkage for the two bottom stays and is 'normally' positioned between $\frac{3}{8}$ ths and $\frac{1}{2}$ inch above the base. On the long legged examples this bracket is positioned about 1 inch above the base. Hence in order to restrict the dipping movement to reasonable limits the pan legs have to be extended between $\frac{1}{2}$ inch and $\frac{5}{8}$ inch.

Examining a number of Mordan roberval postal scales it seems Mordan (and other scale makers) restricted the gap between the bottom of the pan legs and the scales base to about $\frac{3}{8}$ inch and adjusted the length of the pan legs to achieve this. So, I think that is problem solved, unless... .. !!

Another interesting feature revealed by Andrew's article is the absence of protective metal pads that are positioned under the pan legs of roberval postal scales mounted on wooden bases. The metal and shell based scales shown in Andrew's article are not fitted with these pads which is surprising as these scales are obviously of high quality manufacture and intended as prestigious items.

Contrary to this a recently acquired scale in my possession (figure 2) does have these pads fitted and yet the scales structure has many similar features to the scale featured by Andrew as Fig 1 on page 2990.

All in all a very thought provoking article in an issue of EQM that was full of interesting snippets for the avid scale collector.

Figure 2 ▼▼ Pads on a Mordan brass base are most unusual.



Response on Mordan

BY MICHAEL ROBINSON

Further to Andrew Crawforth's article in EQM, pages 2990-2993, I have some comments about the aesthetics of Mordan's designs and about the identification of Mordan's weights.

If the exceptionally deep (thick) pair of weights were made for the scale shown on page 2991, Figure 4 (and the bottom weight seems to fit the tray very well) then there must have been at least two smaller weights, thus obscuring the A-frame even more from the owner's view. In my opinion, Mordan did not seem too concerned about hiding the A-frame and pointer from the user, although he certainly had two means at his disposal to do so. (1) He could have raised the A-frame as shown in Figure 4, page 2991. (2) He could have used the shallowest and largest diameter of Mordan's three weight types.

MORDAN WEIGHT TYPES

1. The extremely thick weights with the smallest diameter as shown in Figure 4, page 2991.
2. The commonest middle range, stamped with oz above the number, where the two-ounce weight was $\frac{3}{8}$ - $\frac{7}{16}$ inches thick with a diameter of approximately $1\frac{1}{4}$ inches, as shown in Figure 5, page 2992.
3. The extremely shallow weights with the largest diameter. A shallow weight stamped with oz above the number, where the two-ounce weight was just under $\frac{5}{16}$ inches thick with a diameter of $1\frac{7}{16}$ inches. A set of 4, 2, 1, $\frac{2}{3}$ and $\frac{1}{2}$ oz would have a height of only $1\frac{5}{16}$ inches.

In my opinion, making a fancy base, but with a common or plain A-frame being obscured by the weights, is not a hanging offence. However, making a fancy base, with an ornate A-frame obscured by the weights was definitely a hanging offence!

Looking at a few examples of postal robservals on the Front Cover of past EQMs, the aesthetics of placing the weights becomes clearer:

EQM p 125 Setton & Durward of Birmingham scale with three weight receptacles, leaving the A-frame exposed. Excellent design.

EQM p 681 Mordan weight tray centrally placed, hiding the ornate A-frame, but not hiding the upwards pointer. Would it look better with shallow weights?

EQM p 821 John Round scale with weight receptacle way to the right of centre, leaving the engraved A-frame and the downwards-pointer exposed. Great position.

EQM p 933 Mordan weight tray centrally placed in front of common A-frame which, when complete with top-knot, hid the A-frame and the downwards-pointer. Shallow weights and a raised A-frame would have helped.

EQM p 993 Anonymous, probably Townshend. 2 sets of weights, to each side of centre, leaving the ornate A-frame exposed, and not affecting the upwards-pointer. Terrific.

EQM p 2057 Mordan 2 sets of weights, to each side of centre, exposing the A-frame and the downwards-pointer. Brilliant.

EQM p 2589 Mordan weight tray centrally placed, hiding the ornate A-frame, but not affecting the upwards-pointer. Not too good.

EQM p 2957 Mordan weight tray centrally placed, hiding the ornate A-frame, but not affecting the upwards-pointer. Crying out for two weight trays, one each side of the centre.

I think these examples prove my assertion that Mordan was not interested in whether the weights obscured the A-frame. In fact, maybe I could go further and say that Mordan was so proud of his fine stacks of weights that he wanted them in the most prominent position in front of his scales, regardless of how much they obscured his beautiful A-frames.

Mordan weight characteristics

- (a) No rings incised into the rims, (a 'must' in my opinion, for postal stacking weights.)
- (b) Cased [lead-filled] on larger denominations
- (c) A concentric step inside below the outer rim
- (d) The stamp oz above the unit or the unit above a line with oz below.
- (e) Weights for 6 oz, 10 oz and 12 oz denominations made only by Mordan (as observed during the past 35 years of my interest in postal scales.)
- (f) Stepped weights for Postages (P)

To move on to those fine stacks of weights:

So there are five facets of weights unique to Mordan postal scales. These features also apply to Mordan sets where the weight is expressed in Postages [half-ounce units, each requiring one penny stamp] or where F is stamped [quarter-ounce units, the standard weight of the letters to the Continent of Europe]. I don't remember an oz over the $\frac{1}{4}$, or an F weight, having a step round the inner rim.

I bought a puzzling set of four postal weights last year for 4, 2, 1 and $\frac{1}{2}$ oz with the following features:

- | | |
|---|----------------------|
| (a) Two rings incised on top of the rim | Not a Mordan feature |
| (b) Probably no cased weights | Not a Mordan feature |
| (c) A concentric ring inside the rim | Mordan |
| (d) oz over each denomination. | Mordan |

Could these semi-Mordan features be a late development? By a descendant? By an employee who went off and started his own company?

As I pointed out in the talk I gave on Mordan in 2001(?) Sampson Mordan had six children, two of whom, Sampson II and Augustus, took over the business in 1843 when their father died. They did not change the name of the company; in fact the name of the company was maintained until 1953, when they went into voluntary liquidation.

So, I was intrigued when I found a Stoneware Ink Bottle stamped on the base with a Victorian Diamond Registration [used only between 1839 and 1884] and "F MORDAN'S REG INK FLASK". Sampson Mordan's main customers were wholesale stationers, as were Mr. F Mordan's. Any connection, I wondered?

Author's Biography

Michael Robinson, the Chairman of ISASC Europe, has, for 35 years, had a passion for person scales and postal scales. He has recorded full-size the A-frames of Mordan scales since about 1980, and annotated the drawings with retailers' names. See EQM p 949 for a short run of his records shown in miniature. Until recently, with the new stimulus of David Thomas' enthusiasm, no records have been kept of which design of weights was sold with each design of A-frame.

Postal Scales for Collectors

BY TONY SHAMAN

Editor's Note: This article is reprinted from the November 2004 issue of *American Philatelist*. We include it here in order to show our members a different view of postal scale collecting and as a service to our newer member collectors. The original photos were not available and have been replaced by the editor.

With an ever-growing list of technological innovations touching every aspect of our lives, it is not surprising that we take our many modern inventions for granted. Included in our fast-paced world is the equipment used by post offices to speed our mail on its way.

A postal clerk, for example, places a letter or parcel on a digital scale and a "read-out" appears almost instantly on a screen showing not only the item's weight but also the amount of postage required to mail it to its destination. At the push of another button we are shown the various postal rates applicable for the different means by which the item can be shipped, such as surface or airmail, first class or standard, registered, express or priority post, or by whatever other transportation methods the post office has available. Gleaning all that information at the touch of a button is taken for granted in our technologically-driven society.

But not that many years ago, certainly within living memory of some of us, a variety of mechanical scales equipped with removable rate charts or paper sleeves imprinted with applicable postage rates were the norm. Postal clerks relied on those trusty rate charts, paper sleeves, or metal plates to show the effective postal rates for the different classes of mail shipped to various destinations across the country or around the world.

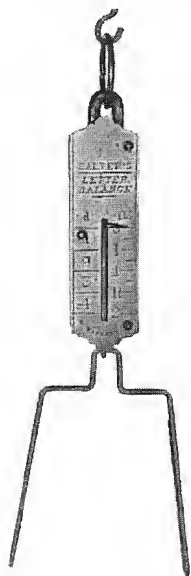


Fig. 1a ▲ Salter hanging spring balance scale. The postal rates shown on this 7⁷/₈" long scale can be used to date it to c1865.

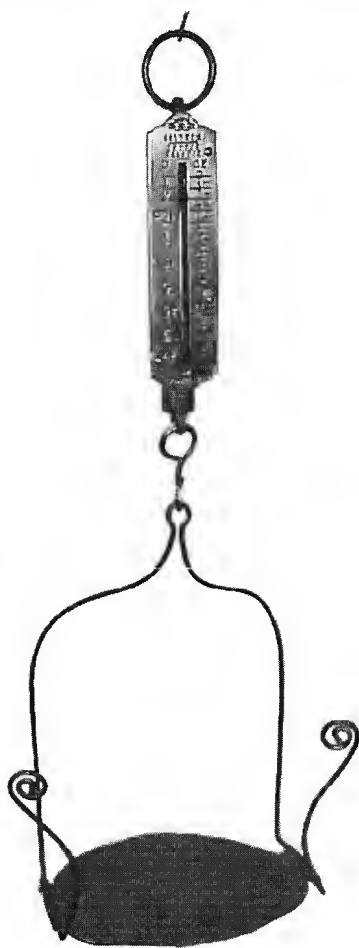


Fig. 1b ➤ The postal rates shown on this 15¹/₂" long Salter scale can be used to date it to c1915.

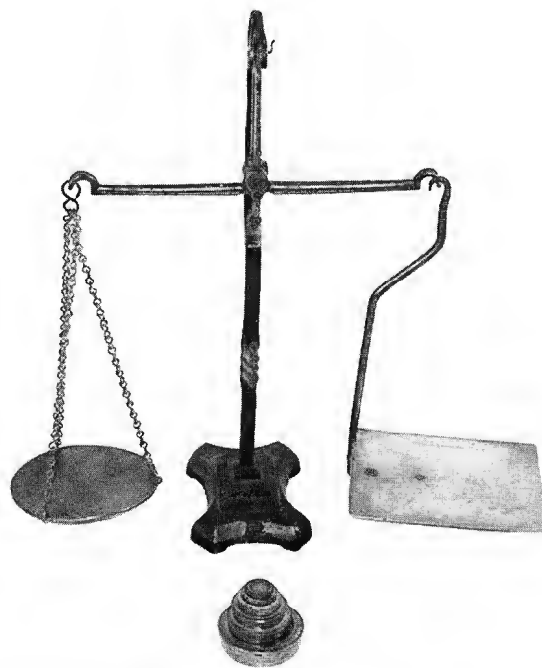


Fig. 2 ▲▲ Corporate owned Canadian Post Office scale dating from about 1900.

Of course, those old-style mechanical scales were not equipped to calculate the extra charges for registered or air mail, or for special delivery where that service was available. It was a time long before Priority Post and Express Post existed, and the old-time mechanical scales performed their intended functions.

Postal rates and routes are important components of stamp collecting and the study of postal history and philatelists were the first to recognize that postal scales possessed all the desirable attributes of desirable collectible items. As a result they were in on the ground floor of antique postal scales collecting but have more recently been joined by the more broadly based collecting community. In historical terms, the postal scale era, as opposed to scales in general, takes up only a small fraction of the time since scales made their appearance thousands of years ago. For that reason, postal scales make up a correspondingly small part of scale collecting, albeit an important one.

The first scales are known to have existed in ancient Egypt at least 7,000 years ago; the first postal scales, on the other hand, date back less than 300 years when the British Post Office Act of 1710 came into being. This Act was relevant in Canada because it also applied in the Canadian provinces until the post office was transferred to the Province of Canada in 1851. It provided the first outline of official postal rates as follows: a letter consisting of one sheet was charged the single rate; two sheets were charged double the single rate; and for each additional quarter ounce or fraction thereof the charge increased by one additional rate.

For example, for a letter weighing three-quarters of an ounce the charge was three times the single rate; a letter weighing an ounce and a quarter would be rated five times the single rate. For serious scale collectors, or for those with an interest in postal history, it might be mentioned that scales from that era were calibrated in grains or pennyweights with a single pennyweight equaling 24 grains or 0.05 ounce troy.

However, just because the postal system at that time changed from a payment system based on the number of sheets per letter to one based on the letter's weight does not mean that postal scales came into use overnight. Far from it. For reasons of economy, the majority of letters from the 1700s, and even into the 1800s, consisted of one or perhaps of two sheets of paper and there was no need to weigh them. They were simply charged the single or double rate, depending on whether it was a single- or a double-sheet letter.

It was not until envelopes with their pre-gummed flaps became widely

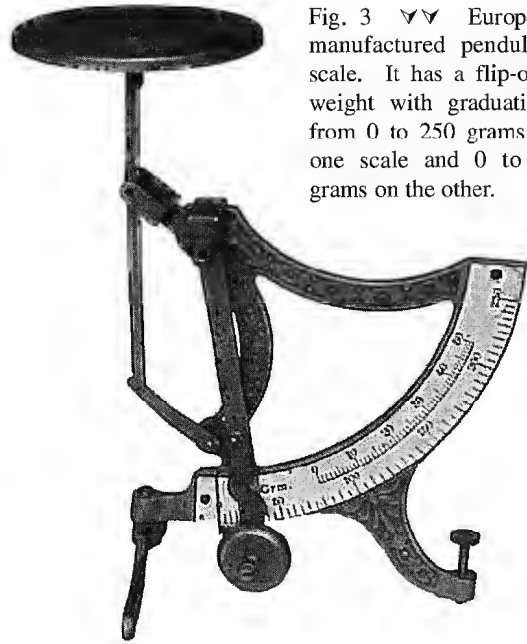


Fig. 3 ♡♡ European manufactured pendulum scale. It has a flip-over weight with graduations from 0 to 250 grams on one scale and 0 to 50 grams on the other.



Fig. 4 ♡♡ Austrian bilateral type postal balance for foreign letters. Capacity 8 ounces.

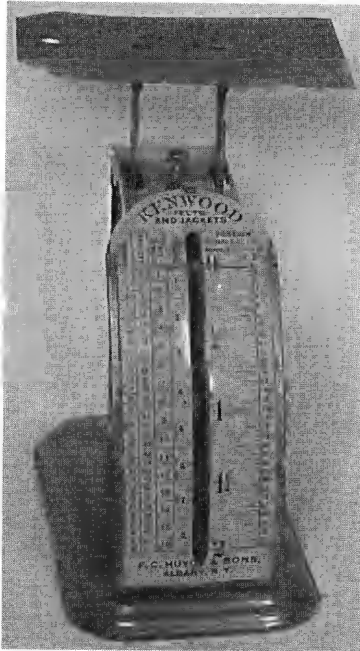


Fig. 5 ▲▲ Promotional compression spring scale, circa 1910, advertising Kenwood Felts and Jackets by FC Huyck & Sons in Albany, NY. The top plate is shaped like a hang tag of the day. 2 pound capacity.

accepted by the public that we begin to see the ubiquitous use of postal scales in post offices. Before the introduction of envelopes around 1840, postal clerks could easily count the sheets comprising the letter and charge accordingly. But once people began to seal their letters in envelopes, postal routines changed dramatically.

Sir Roland Hill's introduction of adhesive postage stamps in Great Britain, together with the Uniform Postal Act of 1840, were the catalysts that forced local post offices to install postal scales. At about the same time, England began to experiment with street letter boxes, also known as pillar boxes because of their pillar-like shape that allowed the public to mail letters for the first time from a place other than from a post office. For all these reasons, postal scales eventually became the nucleus of every local post office.

The earliest scales used specifically for postal purposes were quite ordinary in appearance and simple in design. Typical examples are the spring balance scales manufactured by the Salter Company of Great Britain. Dating back to the 1840s, these scales were in widespread use throughout England and Canada. These spring balances were manufactured as either hand-held or desk-top models depending on the type of spring that was used. Hand-held models, also known as "hanging" scales, because they are suspended from an overhead support, make use of a coiled extension spring that provides the balancing force.

This extension spring is installed in a direct line between the support holding the top end of the spring and the load being weighed suspended from the bottom end of the spring. The weight of the letter is read directly off an attached pre-printed paper sleeve that is attached to the spring housing showing a series of incremental weights with their corresponding postage amounts. A wire clasp, or metal clip of some sort attached to the spring, holds the letter in place while it was being weighed.

Spring balances using a compression spring, as opposed to the extension spring for the hanging-type scales, come in desktop or table models. As with the "hanging" scale, the compression spring is also

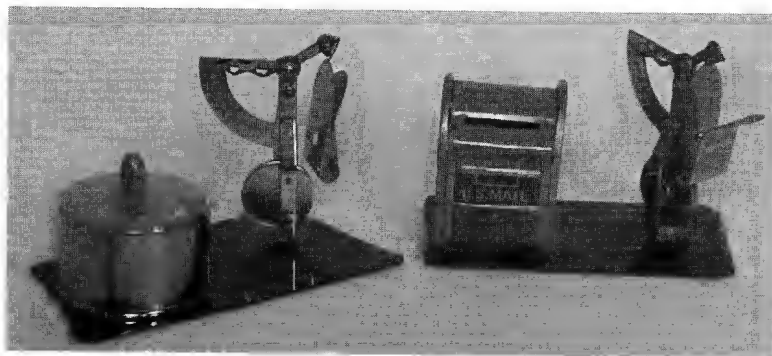


Fig. 6 ▲▲ Combination postal scales with coil stamp dispenser. These cheaply made postal scales measure 3 1/4" high and stand on a 4" long base.

installed in a direct line between the base of the scale and the item to be weighed, usually in some type of attached pan at the upper end of the spring. Another commonly used name for the compression-type balance scale is "candlestick" because of its obvious resemblance to a candleholder.

Available at modest cost, and sufficiently accurate for postal purposes, these spring balances were in

common use for more than 100 years. The British-manufactured Salter spring balances, both desktop and hanging models, remained in use in Canadian post offices especially in the smaller, rural offices until the 1970s.

Collectors divide postal scales into two main categories: corporate-owned post office models that include all those used in post offices, and commercial scales used by postal clients usually at their places of business or in private residences. Post office scales, that is those owned by the post office, usually have an identifying mark showing that they are an official postal scale and the property of a postal administration. As government property, they have never been freely available to the public and for that reason are not easy to find. Commercial postal scales on the other hand are reasonably plentiful and relatively easy to acquire. A typical, circa 1900, post office scale in widespread use is one known as the equal-arm

balance. Although substantially more modern in appearance than its earliest 7,000-year-old predecessors from ancient Egypt, the equal-arm balance started out as a straight beam supported by a fulcrum at its horizontal centre. The base of the fulcrum was fastened to a pedestal to give it the needed support. Suspended from each end of the beam were pans attached by ropes threaded through an opening at each end of the straight beam: one to hold the loose weights, the other the item to be weighed.

By about 2,000 years ago, the Romans came up with the idea of placing a pin through the centre of the beam to hold the central bearing in place. Improvements to the equal-arm balance continued to be made and with the invention of knife edges in the 18th century it was on its way to becoming one of the world's most accurate weighing devices.

Unlike spring balance models, the equal-arm scale uses no pre-printed sleeve or chart to denote the required postage. Instead, a set of loose weights are used that correspond to the weight classes for the various postage rates. For example, the letter to be mailed is placed on one pan and incremental loose weights are added to the other until the two sides are balanced. Prior to 1669, the pans were suspended below the rigid beam by a rope or chain attached at its two ends. Then along came Gilles Personne de Roberval, a French mathematician with a bent for things mechanical. For ease of operation he moved the pans above the beam in a redesign that held them in place by vertical supports. He also added a lower, second beam, running



Fig. 7 ▲▲ The Presto letter scale is a wedge shaped steel scale that is not very accurate. It is patent no. 2,458,129 of Jan 4, 1949.



Fig. 8 ▲▲ Novelty style award scale with weight pan inserted in housing (left). Identical scale showing weight pan in operating position (right). These scales were made by Thompson Engineering and are design patent number 155,944 of Nov. 8, 1949.



Fig. 9 ▲▲ The Merchant's metal advertising pendulum scale. W. Eschemann was granted patent number 668,349 on Feb. 19, 1901 for this advertising letter scale.

parallel to the top beam, to provide support for the vertical pan supports. By the time postal scales came into widespread use in the 1840s, another French innovator, Joseph Béranger, had introduced a further improvement whereby the pans were supported at multiple points for greater stability.

Although the exact age of a particular postal scale is frequently difficult to judge, its approximate age can sometimes be narrowed down from the date it was taken out of service. As we have seen, most spring-type scales have a paper sleeve or rate plate attached to the scale that are time specific. Postal Guides issued by national postal administrations contain listings of effective postal rates and the rates shown on the weight stickers attached to scales can be correlated to the rates in these guides. For example, the first-class letter rate to the United States in the 1920s was three cents per ounce and within Canada the rate was two cents per ounce. Therefore, a scale with a chart showing those rates would have had to have been manufactured before that time.

Until the 1920s, the Canadian Post Office Department relied on Great Britain to supply it with postal scales because none were manufactured domestically. After that date, American manufacturers became more serious competitors. For instance, the U.S.-built Precision model, a spring-loaded device capable of weighing up to four pounds, was one of the most recognized postal scales used in Canada. Built by the Triner Scale and Manufacturing Company of Chicago, it was one of several models in widespread commercial and private use. Other office scales manufactured by Triner include the Gem, Ideal, Liberty, and Reliance models. These, along with balances built by competitors such as Pelouze and Pitney Bowes, can be readily found at flea markets, antique shops, or even at a good yard or garage sale for as little as several dollars.

The Tiffany organization, known for its quality merchandise, particularly high-end jewelry, also manufactured postal scales. A Tiffany-style balance is, understandably, priced substantially higher than run-of-the mill-type balances found at yard sales. Several hundred dollars is the asking price for early brass scales such as a Roberval brass balance. Many of the most expensive scale models are museum pieces that seldom come on the market.

Scales still in their original packing boxes are always more desirable than those without them. But, as with most collectible antique items, they are difficult to find.

Britain's best-known postal scale manufacturer, the Salter Company, began producing spring balances in the late 1700s. Founded by Richard and William Salter, the company has been in continuous operation for over 200 years. A collector should expect to pay close to \$500 for an 1840s-era Salter candlestick brass postal scale that has been chemically treated to produce its characteristic rich, dark-brown patina.

Postal scale manufacturers in many parts of the world produced a wide variety of promotional models.

Corporations from virtually all sectors of the economy distributed postal scales to clients to promote their products and services. A typical example is a spring-type scale handed out by F.C. Huyck & Sons of Albany, N.Y., to promote the company's array of Kenwood Felts and Jackets. Hanging scales with large, brightly illustrated metal dials were particularly well suited to promote a company's products to its customers. Merchant's, a U.S. metal and tile company, for example, is well known for its colourful sheet metal dial on a hanging-type scale that advertises its line of Spanish Tiles, Star Ventilator, Gothic Shingles, and High Grade Roofing Plates.

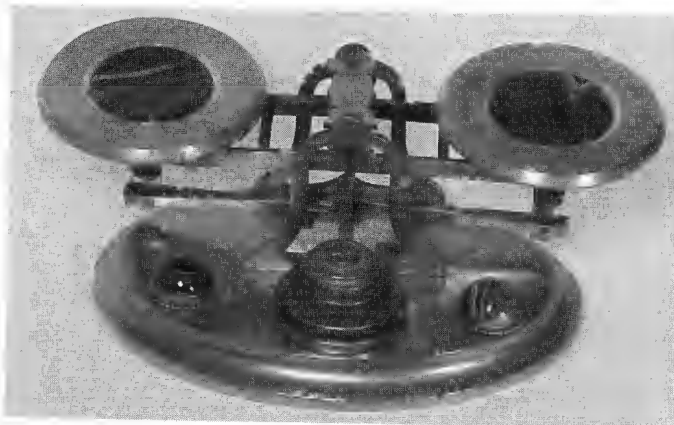


Fig. 10 ▲▲ English roberval balance with alabaster inserts in the letter plates and agate cabochons on the base. Signed Edwin Bradford and attributed to Mordan.

Novelty scales were equally popular as promotional tools. Typical examples resembled letter openers, fountain pens, tire pressure gauges, and the like. The Salter pen-style scales equipped with a clip attachment at the end of the pen-like device were particularly popular with the public.

Predating the novelty-type scales are the combination scales that date back to the late nineteenth century. In 1888, James Allen of Birmingham, England, designed a pocket letter scale combined with a postage stamp box. His creation resembled a locket. Made of polished brass and silver, the combined scale and stamp box is quite small, measuring only about 1.7 inches in height. Given its tiny size, it is surprising that it is capable of weighing items up to six ounces.

Weight is the main factor in determining the cost of sending a letter or parcel and for that reason the postal scale is a practical fixture in every post office or business office that sends out mail. We have briefly touched on several models. But there are numerous others.

For example, there are the uneven-arm, pendulum, double pendulum, inclination, and quadrant balances that were, at one time, used wherever quantities of mail originated. As one might expect, there are uncounted different variations of each of these major scale designs manufactured in countries around the world. This vast choice for collectors means that there are collectible postal scales to satisfy every taste and pocketbook.

Caught up helplessly in a fast-paced, ever changing world it is not surprising that people are attempting to strike a more satisfying balance in their lives by surrounding themselves with nostalgic items that remind them of simpler times when not everything was accomplished with the push of a button. Antique postal balances fall into that category.

Because antique postal scale collecting, an offshoot of the much broader field of scale collecting in general, is well defined, stamp lovers have found in postal scales a fascinating collecting sideline. The pursuit of postal scales is no longer limited to stamp collectors who, for some time now, have been reaching out beyond philatelic ephemera into other areas of postal-related collectible material. Postal scales are becoming ever more widely known as desirable items to own and enthusiasts in growing

numbers are adding these attractive creations to their collections.

About the Author:

Tony Shaman, FRPSC, has been collecting stamps since the age of eight. His philatelic interests include the postmarks of Canada, the stamps of the United States, and several team sports depicted on stamps. He is the current editor of *The Canadian Philatelist*, the official journal of the Royal Philatelic Society of Canada.

Notes:

Shaman, Tony . "Postal Scales for Collectors." *American Philatelist* (Nov. 2004): 994-999. Used by permission.

Notes & Queries

FROM JAMES REEVE

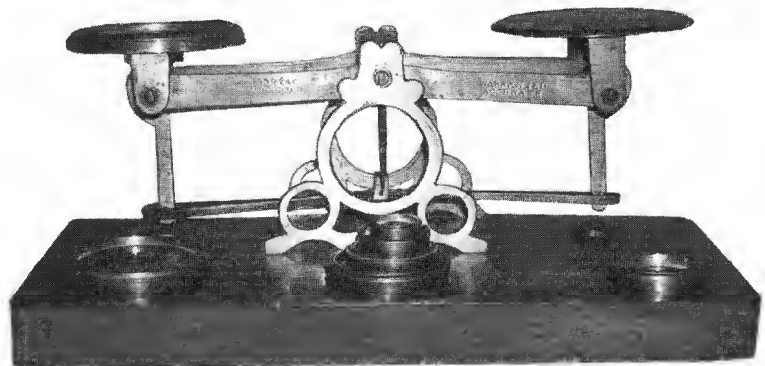
N & Q No. 149

I'm a 15 year old beginning collector. Can you help with information on either of the scales in the attached photos? The candlestick is 3⁵/₈" tall and its base is 2¹/₈" in diameter. It has no markings other than the number 15 on the graduations and some numbers on the base. The roberval is marked Perry.

Response: The candlestick is exceptionally small, and I know several people who would be thrilled to buy one that size. I think it's probably made in England, although I've never seen a narrow neck at the bottom of the pillar before. I think it was made for sale in France, as I think the 15 means that it measures the 15 gram postal rate. He could try putting a 15 gram weight on it to see whether it's approximately correct (they are seldom accurate). If that proves to be the case, the date of the candlestick was between 1849 and 1862.

The Perry roberval is nice but not rare. Perry did not manufacture scales. They were stationers' suppliers in London, and they bought scales from Narcissé Briais in Paris to sell in England (yes, scales went from England to France, and at the same period, from France to England!!) and they bought scales from Samuel Turner Senior in Birmingham. This is what your James has, an STS. He might find the logo (STS with a tiny snake in an oval) punched into the back-side of the front beam, if he's lucky. The date could be anywhere between 1870 and 1920ish. It is difficult to see the weights, but I think the big weight is 100 grams. That suggests that it was being retailed in Europe. Perry had a depot in Brussels, Belgium in 1871, so maybe it was for sale in Belgium. What a fascinating international business!

Diana Crawforth-Hitchins



From Bevin Boy to Scale Collector

BY ROBIN ROBSON

In 1943, when faced with a severe shortage of labour in Britain's coal mines, the Rt Hon Ernest Bevin, Minister of Labour in Winston Churchill's wartime Government, concocted a scheme to divert a proportion of men, conscripted for the armed services, to work in coal production. The system of selection was anything but 'high tech.' since it simply involved Ernest Bevin's secretary drawing numbers from a hat once a month. The numbers were then used to identify the 'call up groups' that were to be employed in the mines.

Those selected, who were usually between 18 and 25 with no experience or background in mining, inevitably became known as Bevin Boys: I was one of those Boys. Between December 1943 and the end of hostilities, a total of 48,000 conscripts were diverted to work in coal mines. It was no soft option as conditions could be appalling. The work was always hard and often hazardous, with death and injury not exactly a rare occurrence.

In 1944 my group's number HNK 1322 came out of the hat and I was deployed to Chislet mine near Canterbury, Kent. Luckily, this was only six miles from my home in Herne Bay, but getting to the early shift could be a trial for it involved a bus pick-up at 5.25 am and a long circuitous tour around East Kent picking up miners en route; a nightmare, miserable journey endured mainly in slumber with occasional vivid dreams of sunshine, green grass and trees!

During the 20 months that I was working underground (it seemed much longer) I sought solace by, voluntarily, acquainting myself with the laboratory at Chislet mine, utilising the experience and interest developed in my school's chemistry and physics laboratories. Occasional use of the school's laboratory scales had been a particular pleasure and was, perhaps, the first awakening of my interest in scales and weights.

Eventually the Chief Scientist for Kent, Frederick Henley Price, persuaded the mine manager that I would be better employed at the mine's lab-

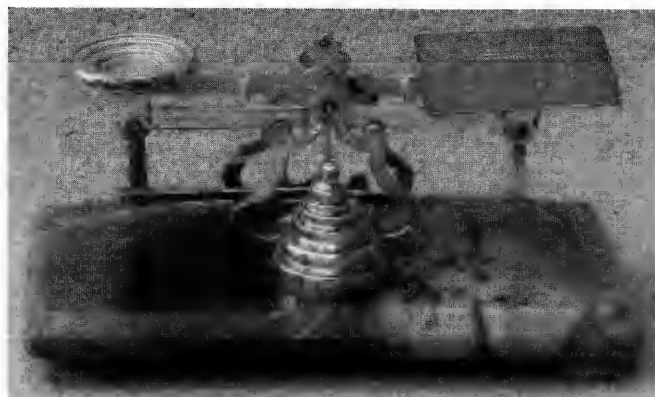


Figure 1 ▲▲ The author has developed a taste for the finest scales! This S Mordan & Co postal scale is silver-plated, and cannot be dated more closely than 1871-1897. The green marble base is a lovely contrast to the silver.



Figure 2 ▲▲ This shop scale went on the counter of a shop selling wet goods, that is, butter, cheese, ham or bacon, that left sticky deposits on the pottery. It was made by Parnall & Sons Ltd, Narrow Wine St, Bristol, probably around 1900

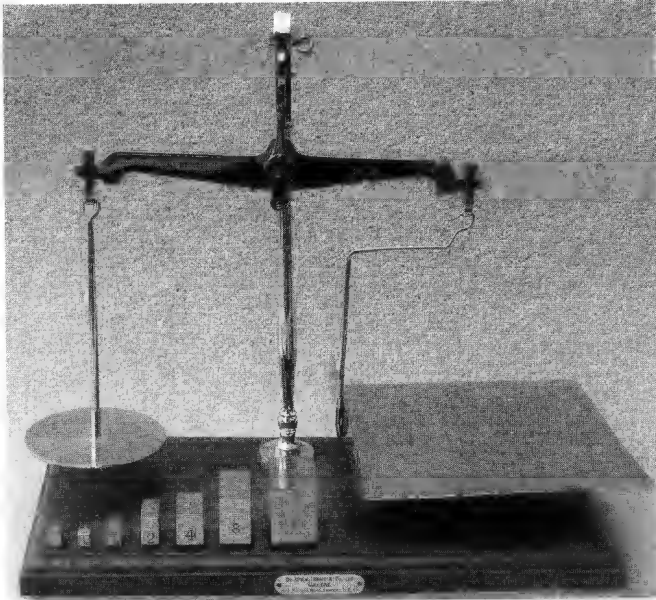


Figure 3 ▲▲ This DeGrave Short & Co. Ltd, of 102 Naylor Road, London, SE16, [their factory address] was made for use in post offices, although, on this one, there is no sign of the Broad Arrow. It has an unusually high capacity, To Weigh 32oz, and thus needs the heavy 11lb weight and the large plate. The beam is made of brass.

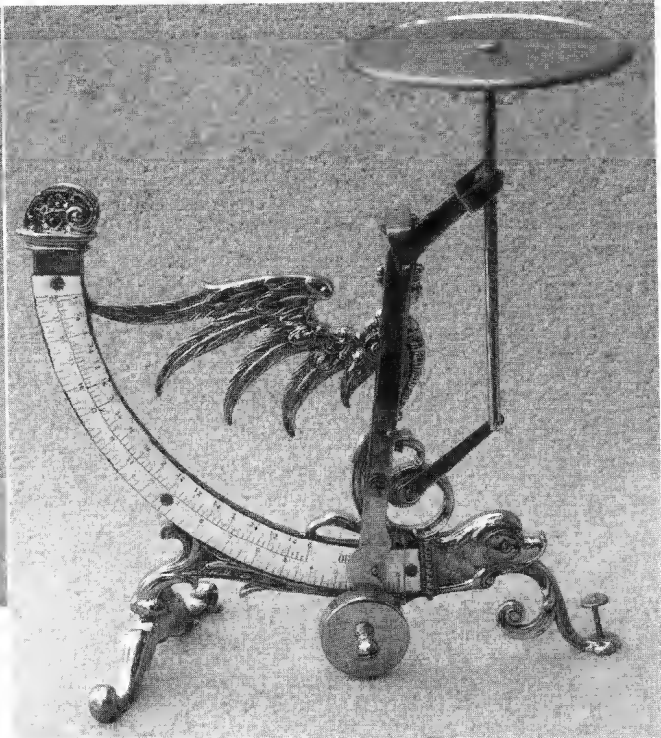


Figure 4 ▲▲ This German pendulum postal scale is of the highest quality. The brass caryatid and dolphin make handsome decorations supporting the plain pendulum linkage. The maker's trade mark is illegible. Made for the British market. The turn-over poise gives a range of 0-4oz when the poise is towards the fulcrum, and 0-16oz when the poise is turned away from the fulcrum.

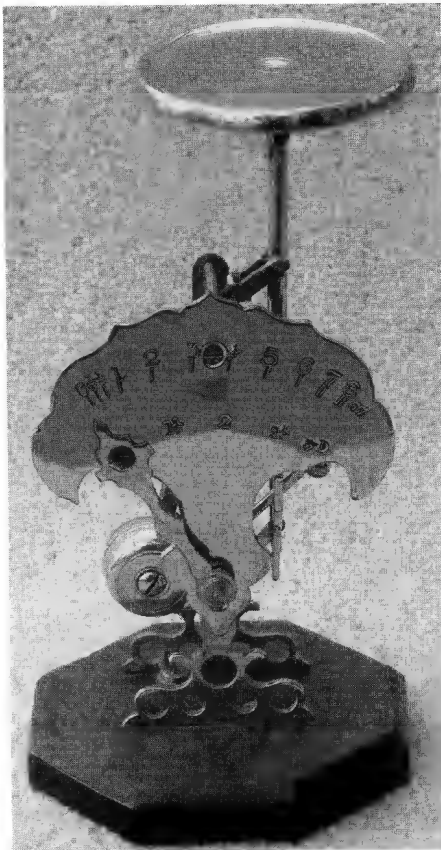


Figure 5 << This postal pendulum scale was made by Marion & Co, although, as with so many of their scales, it is not marked. The postal rates show that it was made between 1923 and 1940.

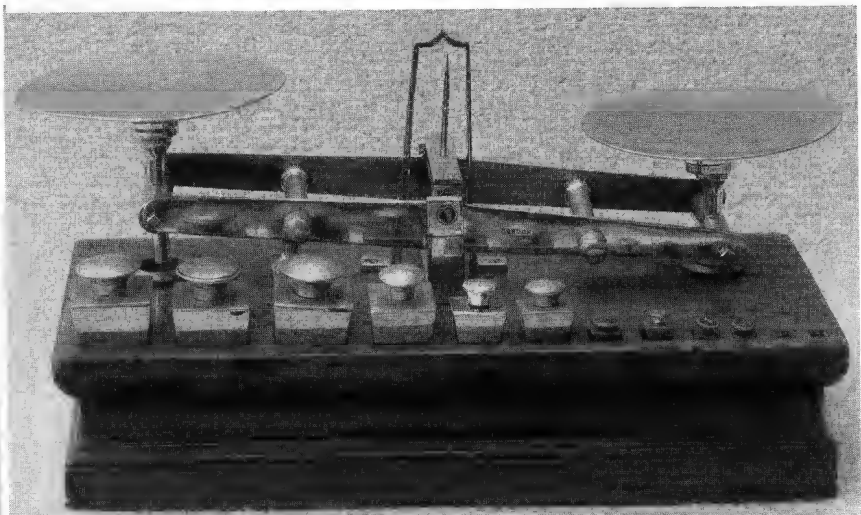


Figure 6 ▲▲ The large enclosed robervals made by J & E Ratcliff for Waterlow & Sons are so distinctive, with their large knobs on the outside of the beam, holding the cross-braces. This example is shown because it is so easy to see how the weights were made.

oratory, collecting samples of mine air and dust. Convincing the manager could have been no easy task for Bevin Boys were supposed to work underground, but persistence paid off and you can be sure I was most grateful for that scientist's powers of persuasion.

Chislet was a 'safe' mine, using naked flame carbide lamps for illumination. Regular tests were therefore essential to detect the presence of methane gas and assess the combustibility of dust, as fire and violent explosion were real possibilities if safety levels were exceeded. Methane levels were reduced and dust concentrations were dispersed by efficient ventilation of the system but regular sampling was essential to monitor conditions. This job introduced me to the delights of the Haldane apparatus and reacquainted me with the use of the laboratory balance.

After four years, came demobilisation. Not for us the new suit and gratuity given to those who had served in the armed services, but I was nonetheless delighted to be able to resume my studies in Chemical Engineering, in which I eventually gained my degree. Subsequent working with the London Research Station of North Thames Gas Board reunited me with the laboratory and made me aware that traditional scales and weights were rapidly disappearing, as electronic equipment displaced the earlier mechanical machines. This consequently gave rise to a wonderful opportunity for collecting; and I was hooked.

With a greengrocer grandmother and butcher father, I was also well acquainted with shop scales and was aware that these were likewise being rapidly superseded by digital devices. Surplus scales and weights were therefore available in great abundance and I began to collect these in frankly unmanageable quantities. Most of these substantial machines now languish in sheds and odd corners and I soon realised that such unfocussed acquisition was way beyond my collecting capacity and a change of strategy was called for.

The desire for space consuming laboratory, grocers and butchers scales was replaced by the quest for more elegant, less bulky but less easily acquired Bankers and Postal devices.

Haunting Kempton Park Antiques Fair became a regular pastime and this also proved to be a place to encounter interesting people such as Ralph Allen, a metal polisher who has brightened up many of my more scruffy purchases.

Around 1994, whilst visiting relatives in York, I encountered a large weight in the fireplace of the family home. Enquiries revealed that this was habitually hauled up the chimney to remove soot. The conversation that ensued from this novel discovery led to the discovery of a nearby Weights and Scales Auction where, pausing to buy a catalogue we met Albert Rangeley. We had an interesting discussion about collecting scales and weights and this inevitably led to an invitation to join ISASC. Membership of the society has been a source of pleasure, interest and much appreciated information ever since.

The transition from Bevin Boy to a collector of antique scales was a convoluted process that has given me an absorbing interest and a great deal of pleasure. If becoming a Bevin Boy was an essential part of that process it almost makes that ghastly experience seem worthwhile.

Acknowledgements:

With grateful thanks to Ken Govier for his assistance.

In Search of Michigan Scale Makers

Dear scale collector friends,

2007 approaches fast and hopefully, we "all" will meet in Detroit. "The local guys" want to surprise you with a presentation about Michigan and Detroit made scales. Greg Moss and myself, Utz Schmidt, started the search in February 2005 and have been overwhelmed to find already over 20 former thriving Michigan Scale Makers and about 190 of their scale patents, mostly for Computing Scales. Unfortunately, the automotive companies overshadowed their presence and after take overs or closures in later years, there is very little information left. We would like to ask you to go through your literature, catalogs, and pamphlets to see if you can help us write a well rounded "History of Michigan Scales". We hope there will also be, after the convention, a publication in Equilibrium with several sequels.

Here is what we found: (Below dates represent the current status of the search)

Company	Location	Date	Company	Location	Date
Grand Rapids Brass Works	Grand Rapids MI	1885	WF Stimpson Company of Detroit MI, a Corporation of MI	Detroit MI	1907
James Larkin (scale maker)	Detroit MI	1886 - 1893	Stimpson Computing Scale Company	Detroit MI	1905 - 1912
J B Dutton Mnfg. Co, The	Detroit MI	1887 - 1888	Detroit Automatic Scale Company, of Detroit MI, a Corporation of IN	Detroit MI	1912 - 1919
Detroit Computing Scale Co.	Detroit MI	1888	Detroit Automatic Scale Company, of Elkhart Indiana, a Corp of IN	Detroit MI	1916 - 1918
Michigan Automatic Weighing Machine Co.	Detroit MI	1889 - 1892	Caille Bros. Company of Detroit MI, a Corporation of MI	Detroit MI	1904
Standard Computing Scale Co.	Detroit MI	1899 - 1934	Caille Company of Detroit MI, a Co partnership	Detroit MI	1905
Stimpson WF & Co	Detroit MI	1899	Caille Brothers Company, of Detroit MI, a Corporation of MI	Detroit MI	1911 - 1950s
W F Stimpson Company	Detroit MI	1899 - 1905	Detroit Scale Manufacturing Company, of Detroit MI, a Corporation of MI	Detroit MI	1914 - 1915
Stimpson Scale & Manufacturing Company of Milan MI, a Corporation of MI	Milan MI	1905	Grand Rapids Veneer Works of Grd R	Grand Rapids MI	1918
Stimpson Scale & Manufacturing Company of Northville MI, a Corporation of MI	Northville MI	1907	Barnes Scale Company, of Detroit MI, Corporation of MI	Detroit MI	1920 - 1931

To contact us: Greg phone 248-338-4496 E-mail gmoss24@comcast.net

Utz phone 810-376-4438 E-Mail schmidtzyutz@thumb.net

Thanks for your help.

Greg and Utz

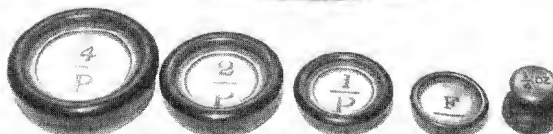
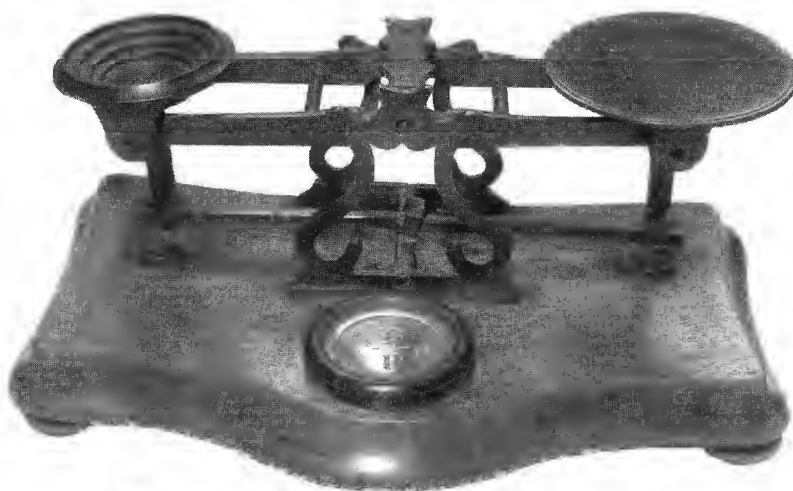
To Clean or Not to Clean?

BY KEN GOVIER

Evocative descriptions of scales that include '...a complete set of Postal weights and in absolutely original condition...' are bound to catch my attention and since this one related to an attractive Mordan postal scale mounted on a serpentine fronted mahogany base I just had to have it. Closer inspection revealed the 'original condition' to be a jet black colour on all the exposed brass parts caused, no doubt, by an accumulation of oxidization, atmospheric pollution and dust.

The hard work required to turn this undoubtedly nice example of a Mordan scale into an attractive, eye-catching, gleaming brass addition to my collection gave pause for thought and recollection of early articles in EQM by Michael Crawforth on this topic. On consulting these articles (a really good read covering 20 pages of EQM between 1203 and 1272) I found that, in his usual thorough way, Michael had covered all aspects of cleaning and restoring scales. Salutory comments about damage caused by excessive cleaning that could turn a scale into little more than a glossy ornament with no evidence of its early life prompted a more careful study of the article. Referring to the clean and tidy appearance of scales in current use and the plain dirty appearance of those that have been neglected and consigned to a damp out-house Michael comments, '...it is the duty of all collectors, as custodians of our heritage, to prevent the deterioration of items in their collection...' I have no doubt he would have approved adding, '... and to preserve historical evidence such as the type and colour of the original finish', for Michael refers to preservation of the different finishes achieved by the whitesmith and blacksmith, the jewel-like finish on steel achieved by skilled scale makers and the various machined, plated and chemical finishes applied to scales. Individuals will make their own choice between doing nothing and producing brassy ornaments but what about my jet-black Mordan postal scale? I suspect the colouring owes more to pollution, staining and neglect than natural wear and ageing but the finish does give some indication of the life this scale has experienced. Furthermore the finish is not grubby and objectionable. Some judicious cleaning of unexposed brass, primarily tops of weights and an application of black wax polish to the remaining brass parts seemed to be appropriate. The result is not unattractive and the appearance remains very close to that of the scale when it was acquired. At the very least my limited action has preserved an example of the appearance brass acquires over many years exposed to the elements. Perhaps it has also suggested an alternative to the appeal of gleaming, highly polished brass.

Editor's note: This article is reprinted from News & Views Issue no. 4, Winter 2004. ©ISASC Europe Sept. 2004. Used by permission.



After cleaning.

Brass Beam Scales-To clean or not to clean!

BY JOHN LOUND

I was speaking recently to three different antique dealers regarding the recent somewhat diminishing values of these items - i.e. brass beam scales and weights -when once again the old chestnut cropped up - To clean or not to clean ?? I always tell them that by selling old beams which are in a filthy condition with brass which is black, harp tops still having traces of old butter or lard on them- or boards in bad condition - they are selling something that never existed! The only time beam scales looked like that, was after being replaced by a more modern scale and were usually put on an upstairs shelf in a stock room and forgotten about until some antique dealer came along! I'm no expert, but do have 51 years in the scale trade - from service adjuster to manager - and in the early days responsible for many hundreds of beams - some shops having up to six or seven used from provision weighing - butter, bacon, lard - to sweets, biscuits, dried fruit and greengrocery -plus back shop sugar scales and others used for almost every commodity that was sold. Beam scales were in the majority, but also counter scales for flour and meal, also potatoes and platform scales for checking goods in, in bulk - all were serviced and checked four times a year, and particularly the beams in the front shop, which were the pride of the shop manager and Monday mornings were always allocated to cleaning them. - This did of course, bring some problems at times, usually from inexperienced staff who - in trying to make the job easier, would start with a bucket of very hot water -ostensibly to get the grease off prior to cleaning, so all the parts, beams boxes and ends all went in - only to find that nothing worked after they had dried and cleaned the parts -then reassembled the scale. When we were called out it was usually an earful from the shop manager that greeted us - "You were only here a couple of weeks ago to service them." That is where I learned about patience!! The first thing was to check how many agates had been made loose and dropped out with the hot water (they were seldom found as they had been thrown out with the water!) and if the manager was still unconvinced, an examination of the balance ball would reveal that it was still full of water! - and even if the agates had survived, the beam could not possibly balance with the extra weight!! I don't recall many apologies, but you can be sure it didn't happen again at that shop - after a hefty repair bill,-at least while the same staff were there.

As an apprentice, I was brought up under a strict, but caring depot foreman who was respected by the customers and the Weights & Measures Inspectors alike, - everything had to be just so, and beam scales were his speciality. I had the job of stripping and cleaning all beams prior to them being presented to the Inspector for stamping after Bill had repaired them. I think he was one of the few Service Adjusters who insisted that as well as the brasswork be cleaned - the cast iron harp tops had to be refurbished, and the oak or mahogany boards repolished. I was taught how to pre-heat the cast iron harps and balloon feet without cracking the cast, clean with heat and wire brush, repaint with black gloss, then to re-decorate with a mixture of gold leaf powder and goldsize - a skill I have never forgotten! I did not excel with the wooden boards, but usually a scrub with warm water followed by a wax polish when dry made a satisfactory job for my master! Bill Baines was an extremely skilful service adjuster who served his time at Parsons of Bradford before moving to the CWS Scales Dept. and opening the Hull Service depot in 1938. -This seems a lot to say about an antique dealers opinion - but perhaps it explains to some degree my own views on the matter!!

(Apprentice-, Service Adjuster, Asst Manager & Northern Area Manager 1938 -1989)

Important Dearborn/Plympton Balance

BY JEROME KATZ & LARRY PUGSLEY

The scale was owned for years by an old time collector of maritime memorabilia in New Bedford, Massachusetts. It was acquired by an antique dealer in Boston who kept it in his private collection for years. He finally put it up for sale on Ebay where I acquired it.

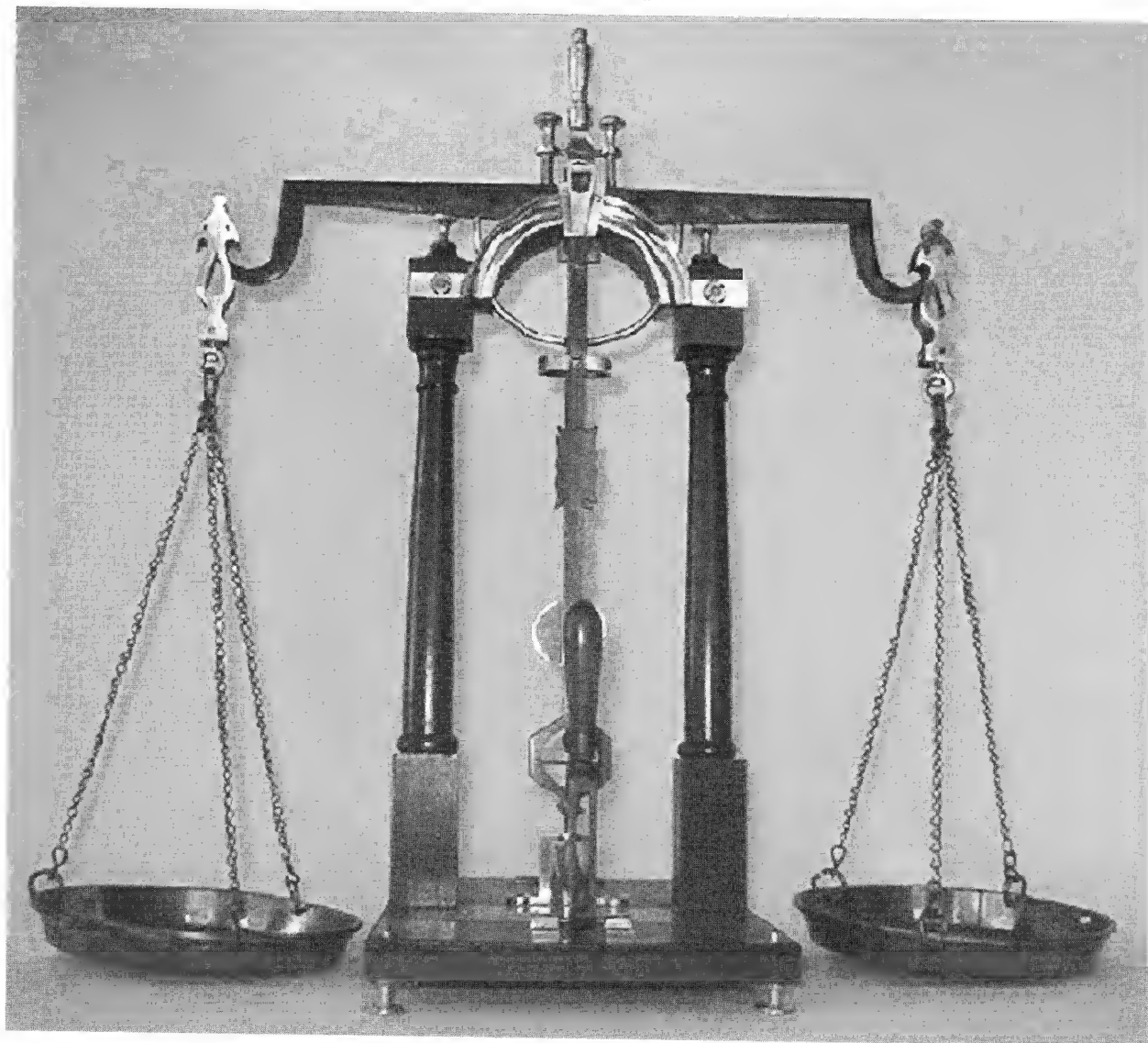


Fig. 1 ▲▲ Dearborn Bullion balance of 1837.

As evidenced by the brass plaque screwed to the outside of the weight box lid and inscribed, "New Bedford/Mass Standard/Troy Weights/ 1837", it must be surmised that the scale and weights were indeed sold together by Henry Plympton to the City of New Bedford, Mass, at that time an important commercially active fishing and whaling center in the United States. Indeed, New Bedford was New England's leading whaling port after 1830. There was also a large amount of shipping commerce

Fig. 2 >> Brass label attached to the base of the Dear-born Balance.

which passed through the port. The word "Standard" strongly implies that they were THE STANDARD of weight in the city, against which other weights could be assessed. Perhaps they were used in the city's central bank or tax office or other fiduciary institution where gold bullion was handled and weighed in the conventional Troy system.

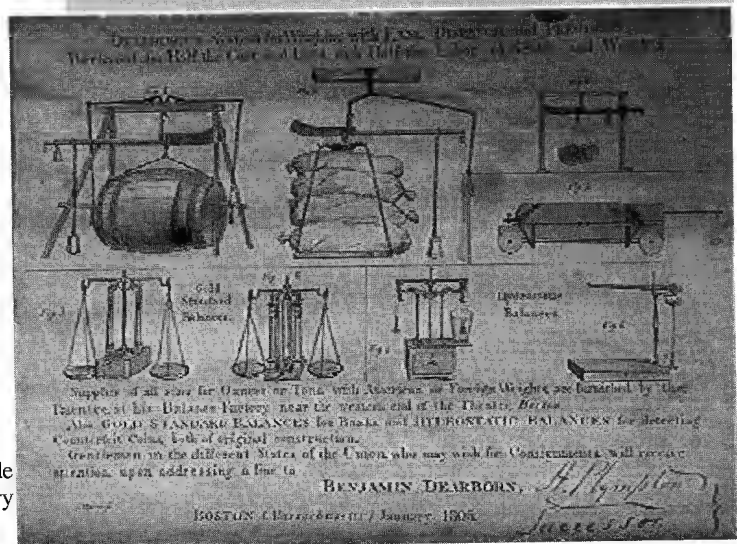
Benjamin Dearborn of Boston first made these balances in 1802 for use in banks. He sold his business in 1828 to Alvan Babcock and Henry Plympton with Plympton becoming sole surviving partner shortly after. Dearborn's design quality workmanship for this equal arm balance is nonpareil. This scale has the column supports made of turned wood; other versions had columns of brass. All other critical design aspects were similar among his scales. The beam is inscribed, "B. Dearborn's Gold Standard Balance Boston Mass". The brass name plaque secured to the wood base is inscribed, "From the Manufactory/of Henry Plympton/Bos-ton, 1837. It is evident that by this time Alvan Babcock was no longer in the picture, and although Plympton designed, assembled and supplied the scale, the beam is "signed" by Dearborn and should be considered his work.

Circular copper pans are supported by brass chain suspended from the beam ends by ornately cut brass stirrups which house the bearing surfaces mating with the beam end knife edges. A decorative urn shaped finial rises from the center of the beam. A wood handled lever lift operates the raising and lowering of the beam for operation. Fine adjustment of the balance was done by tilting the finial with adjustment screws or by sharpening the knife edges of the pan

Fig. 4 >> The paper trade card that is affixed to the inside of the weight box bears the inked signature of Henry Plympton, successor at the lower left.



Fig. 3 >> The brass Standard troy weights marked from 300 down to 1 PWT. It is not known why the weights are marked PWT rather than the standard DWT for pennyweight.



holder on either the inside or outside of the knife edge. The lift lever used to reduce wear on the knife edges was, if not the first, a very early use of this principle. The scale did not come with a glass enclosure, but came with directions and recommendations to construct one to keep drafts or air movement off the scale when in use. A sliding, round brass weight called a motor is attached to the pointer. By raising or lowering this weight the speed and sensitivity of the beam oscilation can be adjusted.

A set of 12 brass weights denominated in Troy ounces, the six larger weights being handled. The weights are stored in a custom made, fitted wood box with velvet lined individual weight compartments. The box at one time was leather covered all around but decay has caused loss of essentially all leather. Decorative brass studs which held the leather still remain nailed to the box. The inside of the box lid has a Dearborn/Plympton business trade card affixed, advertising and soliciting business. The largest of the weights, probably 500 pennyweight is missing. The others are all labeled (PWT) pennyweight from 300 down to 1. There are also a few flat metal weights with varying number of dots on them.

This set must be considered as "historically significant" and rare. It carries two names of scale makers who were major developers of the scale maker's art in early United States, Dearborn and Plympton. No better provenance exists in all of scale making!

About the Author:

Larry Pugsley is a retired landscape architect who bought his first scale while in Mexico on vacation in about 1993 just because. Two years later he found 2 more scales that started his affliction. His wife Joan has also caught the bug and between them they have aquired 400 to 500 various scales of all types. He is particularly interested in grain scales and restoring old grocery scales, while Joan likes the smaller candle stick and pendulum postal scales. They are continuing the search for any type of rare or unusal scales..

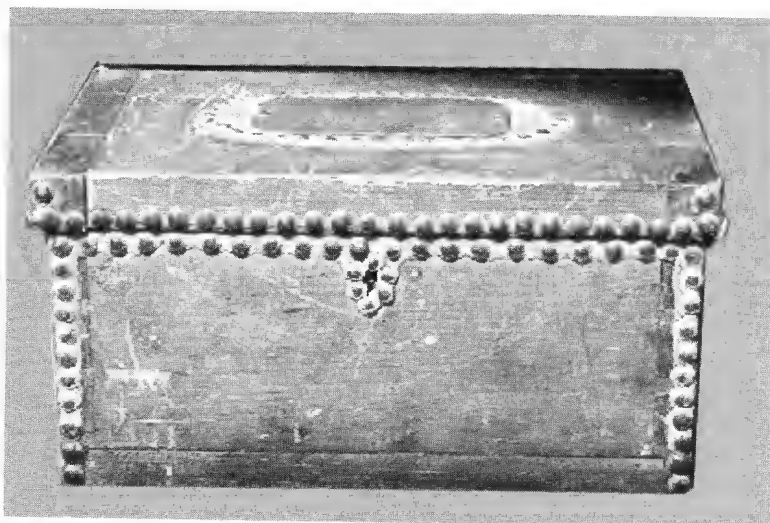


Fig. 5 ▲▲ The weight box for the Dearborn bullion balance has lost its original leather covering to age and decay long ago but retains the decorative brass studs that were holding it. The trade card shown in Fig. 4 is affixed to the inside of the lid.

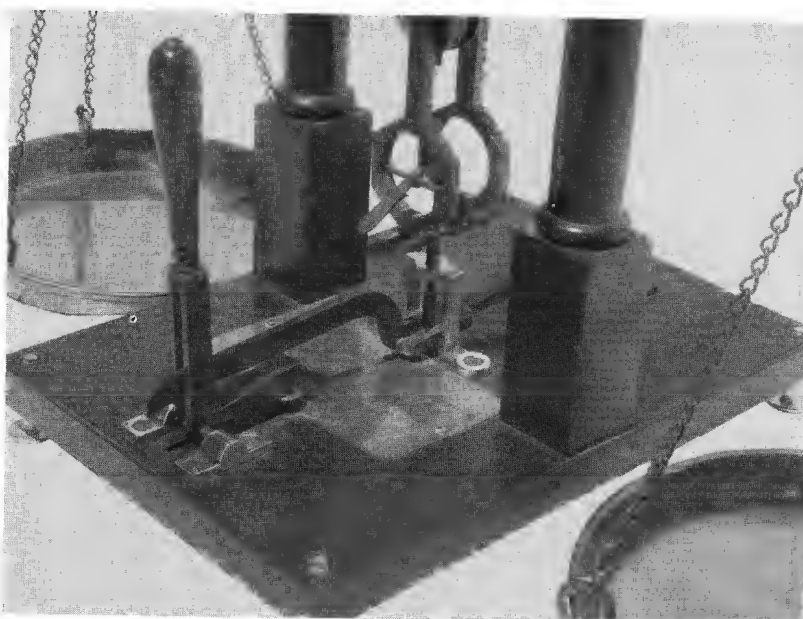


Fig. 6 ▲▲ Detail of the base of the Dearborn bullion balance. This shows the wooden beam lift lever.

Hungarian Rocker?

BY DIANA CRAWFORTH-HITCHINS

I made one purchase at a recent ISASC (Europe) meeting, when a member brought out from his pocket a rocker from Jerusalem. I asked merely for first refusal, not expecting him to sell it, but he said, "Why not?" and I was delighted. This brass rocker was originally plated with nickel, but much of the nickel has worn away – suggesting very heavy usage. The fulcrum consists merely of prongs of brass protruding from the beam, located in holes in the brass pillars, with no hard-wearing steel bushes. It has two curious features (a) a little graduated arc sticking up behind the fulcrum, and a pointer sticking up from the beam, so the user can see whether it's correct, overweight or underweight, and (b) an adjustable poise held by a screw that is located in a slot, so that the poise can be moved along the beam. The pointer is set towards the rear of the beam, to reduce parallax, but that has the side effect of putting extra pressure on the rear bearing and making the rocking action slightly erratic. It is marked "Törv. Védve" and that proves, after searching the internet, to be a Hungarian name only. So which coins does it check? It has four slots, one of which is marked both 1 and 50, so obviously deals with coins of two metals. So which country had coins for 1, 2, 5, 20 and 50? I think the 20 and 50 are gold coins and the 1, 2 and 5 are silver judging by the size of the slots. So I suspected Forints (first minted in Hungary in 1868).

I rang Paul and Bente Withers, the numismatists who wrote that superlative book "British Coin Weights", swearing that I'd done my homework on the Internet, so Paul was willing to help me by looking in his reference books. He wanted the exact size of the slots. With a bit of fiddling about knocking my ruler against the protruding bits of the rocker, I told him the 5 slot measures 34mm, the 2 measures 24mm, the 1 (also the 50) measures 21mm, and the 20 measures 20mm.

Paul has books that show each coin exactly full size, so he measured the photographs of the 19th-century coins used in the Austro/Hungarian Empire, for their diameter and came back with the remark that no coins fitted through the slots. I pointed out that although English rockers have a slot to define the exact diameter and thickness of each coin, with additionally a platter to position the coin along the beam, my rocker (which Paul hasn't seen) has no platter to position each coin, so possibly the slots were merely to check the thickness of the coins and simultaneously to position the coin on the beam.

He then suggested that the coins used in Hungary after the Forint, the Korona, might be the coins being checked. The Korona was minted in 1892-1918, the silver 1 Korona being 22.5mm in diameter, the silver 2 Korona being 27mm, the silver 5 Korona being 35mm and the gold 20 Korona being 21mm in diameter. So each Korona was slightly larger than the slot marked. Paul could not find a coin for 50, so that puzzle will have to await further investigation.

But isn't it great to have seriously well-educated friends? They enabled me to be reasonably confident that I had a Hungarian rocker made after 1892. Can any member of ISASC extend my knowledge any further?

Note: Having no Koronas to use for the photograph, I used an English silver coin to demonstrate the method of use.

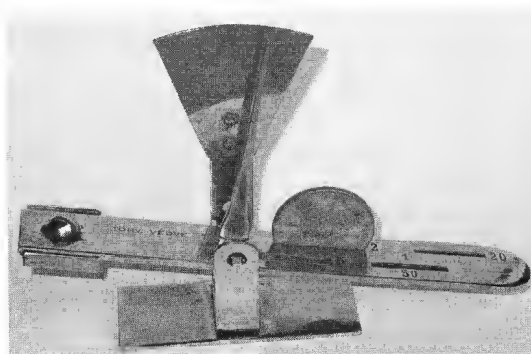


Fig. 1 ▲▲ Hungarian coin rocker signed Törv. Védve.

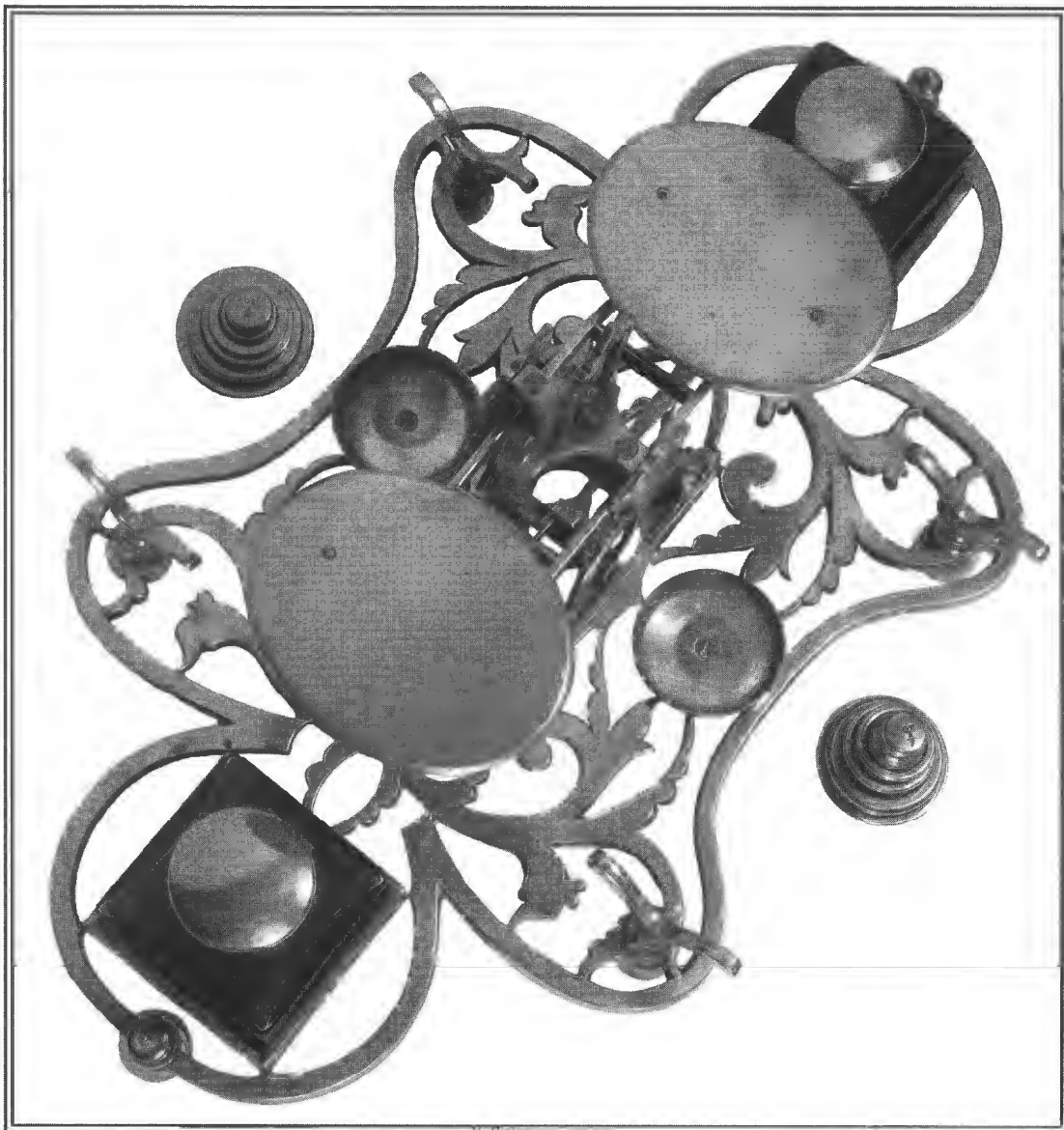


EQUILIBRIUM

QUARTERLY MAGAZINE OF THE INTERNATIONAL SOCIETY OF ANTIQUE SCALE COLLECTORS

2005 ISSUE NO. 3

PAGES 3041 - 3068



Cover Picture

This partners' scale was made by S Mordan & Co, probably about 1880. It is the only example of a partners' scale known. It is made of gilded brass with matching Bristol-blue ink bottles. A different view of this scale can be seen on page 3055.

Partners' desks are not common, but furniture companies made them occasionally for firms such as lawyers' and publishers' where much discussion took place.

See pages 3046-3055 for a discussion about Mordan weights.

Collection of Judy & Eric Soslau.

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Review

Weights and Measures in Scotland: a European Perspective, by R.D. Connor and A.D.C. Simpson, edited by Alison Morrison-Low (NMS Enterprises with Tuckwell Press) ISBN 1-901-663-884. 872pp with 8 colour and 315 b/w illustrations. Price £45 plus packing and postage, available from M S Robinson in Europe or in the USA for \$100 postpaid from Woodstocker Books 15 Meads Mountain Rd. Woodstock, NY 12498.

Many readers of EQM will know of Robin Connor's standard work, *The Weights and Measures of England* (Science Museum 1987). Now Connor and Allen Simpson have produced a substantial volume covering all aspects of Scottish metrology, as well as its links with other European countries, and England in particular. The task was a formidable one, and the result was worth waiting for. In summary, this is a seminal work that will remain the standard reference for a very long time.

The earliest formal record of Scottish metrological standards is usually referred to as the Assize of David I. There is general agreement that, although it may well contain elements dating from David's reign (1124-53), it has (in the words of Connor and Simpson) *clearly been modified for fourteenth century use*. Their conclusion is based upon a careful analysis of the text and the provenance of its sources, and all this is comprehensively detailed in the book. This methodology itself represents a welcome trend in historical metrology. The traditional simplistic assumptions have been set aside, and more rigorous tests of hypotheses are now being deployed. The synthesis of documentary and artefactual evidence must be the key to understanding.

In numismatics, the implications of the status of the Assize of David I are relevant to the question of the relationship between the early Scottish and English weight-standards for coinage. If it is assumed that at one time Scottish pennies were struck on the basis of a 'troy' ounce of 31.1 grams then it is possible to argue that they were intended to be heavier than the English ones. However, Connor and Simpson reject this assumption. Their analysis leads them to believe that the early Scottish pennies were based on a 'tower' ounce of 29.1 grams, and were therefore intended to be of the same mass as the English sterling penny.

The summary in the preceding paragraph ignores numerous complications, which are fully considered in the book. Obvious difficulties arise when we take into account the long series of reductions in mass of the silver penny, beginning in the fourteenth century. More significantly, the argument involves a revision of the orthodox view that the English 'troy' weight-system originated in Saxon times, as set out by Connor in 1987. When this reviewer became interested in the subject, he was surprised to find that the only evidence for this view was the existence of a few atypical artefacts that could be claimed to represent fractions (usually rather awkward ones) of a 'troy' pound. Somewhat inconveniently, these items could equally well represent fractions (different ones) of a Carolingian pound, or indeed any other supposed unit. Based on cursory survey of the documentary evidence, it seemed likely that the English troy ounce was introduced by the London goldsmiths in the second half of the fourteenth century. At that time the tower ounce was still the standard for mint operations, and a commercial (avers de pois) pound of 454 grams was beginning to replace a number of special-purpose pounds, such as the spice pound. The new troy ounce may have been an attempt to ensure that there was a firm relationship between the weight-standards used, on the one hand by the Mint and the goldsmiths (two different systems), and on the other hand by traders in market goods (many and varied systems).

Prior to the publication of the present work, the most detailed analysis of these problems was that of Gemmill and Mayhew in their *Changing Values in Medieval Scotland* (1995). They adopted the view, mentioned above, that the early Scots penny was based on an ounce of 31.1 grams. Like Connor and Simpson, they were concerned with the links between the units of weight and the units of capacity, which were in many cases defined by an explicit relationship. Since the prices of many goods were expressed in terms of the capacity units, the study of prices clearly depends on the magnitude of these units, and there is thus a complex relationship between the various pieces of documentary evidence. Doubtless many more pages will now be written on the subject, but the work of Connor and Simpson offers some hope that order will emerge. Unfortunately the almost universal tendency of people to use 'customary' measures will always serve to confuse and infuriate those who like to find logical coherence in metrological matters.

A new era in Scottish metrology was initiated by the Assize of James I (1426). Among other things, this introduced a Scottish troy pound of 16 English troy ounces (whereas the English troy pound comprised 12 of these ounces). In 1603, when James VI of Scotland became the first king of that name in England, he tried to unify the coinages of the two nations, with some success. But reconciling the weight-standards used in the London and Edinburgh Mints created enormous problems. In 1618 there was a valiant attempt to combine the systems of troy weight and commercial weight in Scotland (but not in England), apparently basing the system on an ounce that was intended to be equal to the Paris ounce. However, despite the precision of the official intention, there remains some doubt about the exact magnitude of the weights. The physical standards that were distributed may have been inaccurate, and in the case of the commercial weights, many localities continued to use their customary units. Many physical standards from this period survive, and a fair proportion of them are in good enough condition to make careful examination worthwhile. A substantial portion (200 pages) of Connor and Simpson's book is devoted to an inventory of artefacts, and the authors have carried out an extensive scientifically-based examination of them.

The Act of Union (1707) decreed that the weights and measures of Scotland should be the same as those of England. The English weight-systems (troy and averdepois) had been fairly well-established since 1588, but there were two major defects. First, there was no statutory definition of the relationship between the two systems: an averdepois pound was believed to be 'about 7000' troy grains, but figures such as 7002 were often quoted. Secondly, the physical standards were not unique, there being over 50 sets distributed around the country, in various states of preservation. Both these defects were repeated in 1707, when standards were distributed to the Scottish counties and burghs. The surviving examples are listed in Connor and Simpson's inventory, with their usual careful scientific evaluations. In effect, the Act of Union marked the end of a distinct Scottish coinage, so subsequent problems with the weight-standard used for coinage (and there were problems) could be attributed solely to the English. But the Scots retained numerous regional variations in the weights and measures used in commerce. Furthermore, the Scottish goldsmiths continued to divide the troy ounce in their customary way, 16 drops of 36 grains, rather than 20 pennyweights of 24 grains, meaning that the English and Scottish grains were still different!

In addition to the important inventory of surviving standards, the book has many appendices, one of which is a list of Scottish makers of scales, weights, and measures. Collectors will find this very

useful for background information about the names found on scales and weights. For example there is much information about the famous firm of John White of Auchtermuchty, founded before 1715 and still in existence. More obscure makers are also revealed. The reviewer was interested to read (p.781) that in 1835 there was a dispute in the Burgh of Falkirk about who was entitled to stamp the weights and measures in accordance with the recent Weights and Measures Act. My interest arose because I have a one-ounce brass weight, stamped FALKIRK BURGH around A.C. & S. It emerges that the initials stand for the firm of Archibald Cochran and Son, one of the contestants in this dispute. One is led to wonder whether there might be a Falkirk weight stamped by the other contestant, the firm of J. & W. Grant.

To conclude on a practical note: the book is beautifully designed and produced, and the price is quite modest for a work of this size.

NORMAN BIGGS

Notes & Queries

FROM UTZ SCHMIDT

N & Q No. 150

Who has a Handy Postal Scale?

Dear scale collector friends,

Recently I finished a little write-up about "Handy Postal Scales". But I think the article is not worth future publication, unless I can add answers for the following questions:

1. Are there other makers aside from Maasstrone and Behrens which both produced the identical scale.
2. Are there identical scales with postal rates, which differ from the ones below?

Postal Rates

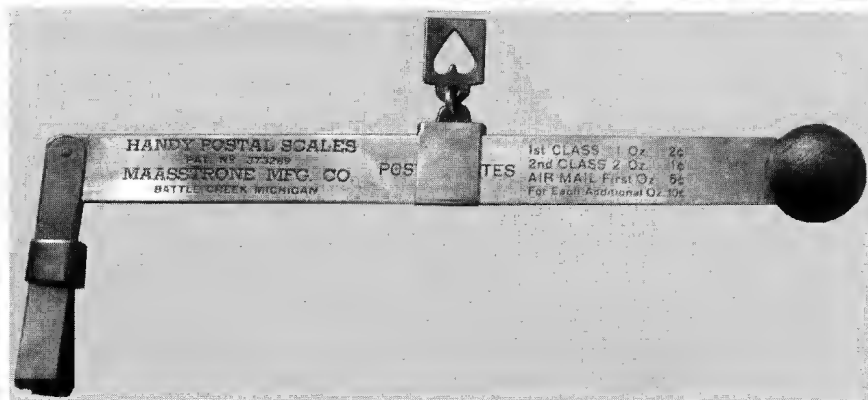
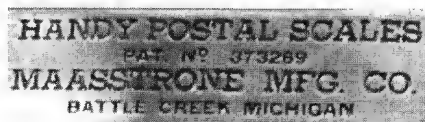
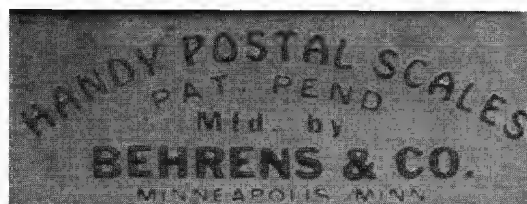
1st CLASS	1 Oz	2¢
2nd CLASS	2 Oz	1¢
AIR MAIL	First Oz	5¢
For Each Additional Oz		10¢

Please contact Utz Schmidt
phone 810-376-4438,

E-Mail

schmidtzyutz@thumb.net

Thanks for your help, Utz



More Mordan Weights

BY ANDREW J CRAWFORTH

Mordan's conviction: "*Quality lives when Price is forgotten*".

Having read an advanced copy of Michael Robinson's thought-provoking article, I was inspired to re-visit a dusty old box of weights and some even dustier thoughts.

Michael states that Sampson Mordan appears unconcerned that his stacks of weights block the view of the A-frame ("*a hanging offence*") and of the pointer on some scales. From another viewpoint, when in use, the weights would be on the pan and the A-frame revealed in all its glory with the pointer exposed.

S Mordan & Co stored their weights in every conceivable position in relation to the A-frame, in front (predominantly), each side, on top, forward on a raised socket, spread along the front, front and back of the A-frame, underneath in a drawer, and underneath in a box.

Mordan & Co used many finishes on the weights to match their scales, including polished brass, gilding, nickel-plating, chromed, silver-plating and solid silver.

There are some weight types, denominations and methods of manufacture that Michael Robinson has not mentioned. No doubt there are even more variations that are neither in his collection, nor in mine. Only by publishing those identified as Mordan weights can our knowledge be extended. These additions are thus assumed to be an incomplete record.

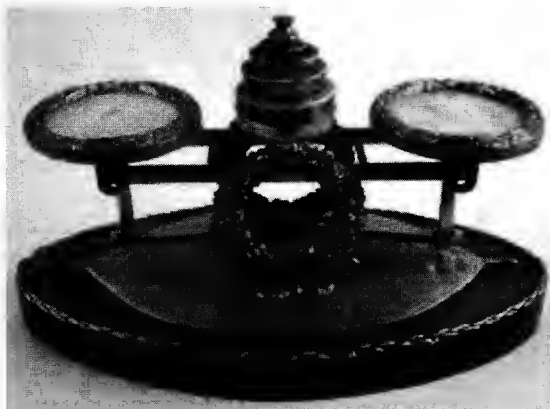


Figure 1. ▲▲ Mordan occasionally stored weights on top of the A-frame, resting on the brace holding the A-frames apart. This scale can be dated reasonably accurately because the scale is mounted on a Zulu shield on a wooden base. The British greatly admired their brave Zulu opponents during the Zulu Wars. The Wars were fought intermittently between 1879 and 1906.



Fig. 2. << 4 lbs brass cased weight, lead-filled. The seam is at the top of the side.

Fig. 3a. >▲ oz 12 brass cased weight, lead-filled.

Book and Newspaper Post had special rates, that were used 1870-1897. The rate went up by 2oz increments from 2 oz-5 lb. These 2 oz increments might explain the 6 oz, 10 oz and 12 oz weights made by Mordan.

Fig. 3b. >> Base of the weight above, showing the seam at the bottom of the side.





Figure 4. ^^ oz 4 solid brass gilded, with concentric rings on the rim.



Figure 5. ^^ oz 1 solid brass, nickel-plated, with concentric rings on the rim.



Figure 6. ^^ 8 TOLA solid brass. Scales and weights for tolas were used in the British Colonies in India.



Figure 7. ^^ 4 TOLA solid brass. The tola was a coin used in India, as well as being a weight. The Bombay tola weight had a mass of 11.56 grams, so the 4 Tola should weigh 46.24 grams. This 4 tola weighs 47 grams.



Figure 8. << 2 oz solid brass, gilded. Very flat with very straight sides.



Figure 9a. ^^ oz 1 1/2 3P, oz 1 1/2 P, oz 1/2 1 P & oz 1/4 F twice. The pan folds out to double size to support a letter. As these rectangular weights were for use with a pan pre-loaded to oz 1/2, the user had to remember to add together the pre-loaded mass and the mass of the weight!! Easy to forget!

Figure 9b. ^^ The gilded weights with tapered sides.





Fig. 10. ▲▲ 8/P solid brass with domed rim. P was the abbreviation for POSTAGES, a 1/2 oz unit.



Fig. 11. ▲▲ Showing the profile of the 4/P weight, one of this part set of domed rimmed weights (the 2/P being lost.)



Fig. 12. ▲▲ 1/P solid brass with domed rim. One postage required one penny stamp, as used between 1840 and 1871.

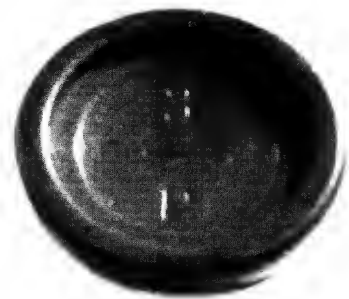


Figure 13. ▲▲ 3/P Solid brass. Rare denomination, being for 3 postages, that is 1 1/2 oz. There was a postal rate for 3 P only from 1865 until 1871.

Figure 14. >> 8/P, 4/P, 2/P, 1/P, F & F. Solid brass P weight stack, complete with final flat F weight with no inner rim, and its mate, a top-knot F. It is thought that the use of P and F stopped in 1871. F is probably the abbreviation of FOREIGN.

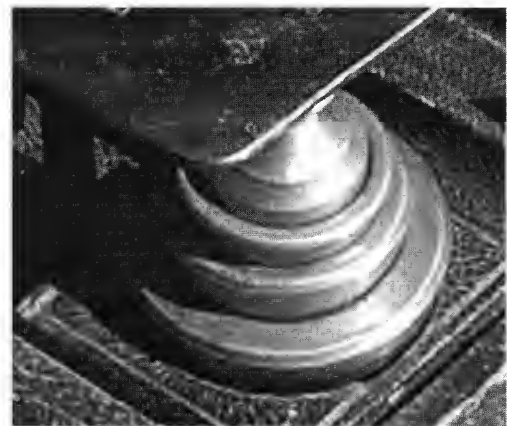
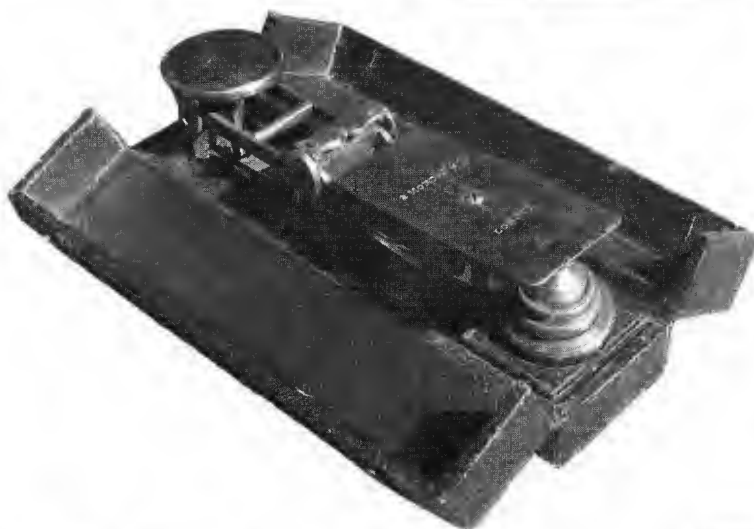


Figure 15a & 15b. <▲ 2/P, 1/P & F with no rim, and F top-knot. Mordan's travelling scale with the weights stored under the swing-round letter-plate.

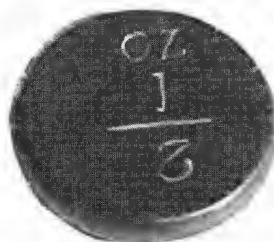


Figure 16a & 16b. ▲ > oz 2/3 & oz 1/3 solid brass discs to store vertically. Conform to the 1870 Commission's regulation size. The 2/3 and 1/3 oz units were used 1869 to 1875 for letters going to the Continent under the Postal Union. Thereafter the lower limit was 1/2 oz.

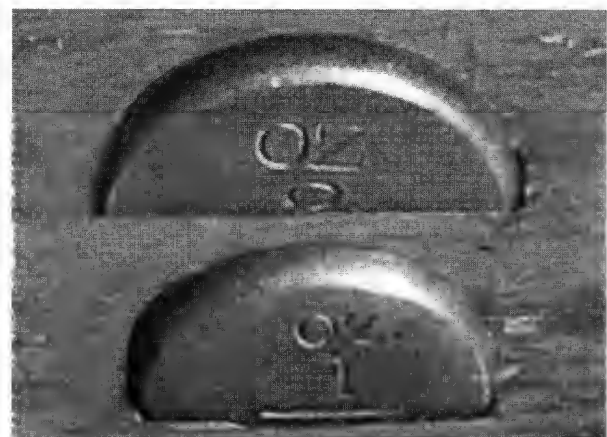




Figure 17. $\Delta\Delta$ oz $\frac{2}{3}$ & oz $\frac{1}{3}$ solid brass with an inner rim on both, as both are over $\frac{1}{4}$ oz. Used 1869-1875.



Figure 18. $\Delta\Delta$ This is the only picture available of the encased roberval postal scale attributed to Mordan. The third weight from the left (which should be a third 8oz weight to match the first two) is a stranger. The smaller sequence should include a 4 oz, 2 oz, 1 oz and two $\frac{1}{2}$ oz weights.



The roberval can be identified as a Mordan by the straight legs below the plates. The cross-braces have no external knobs attaching them to the beams, as would be normal on a Ratcliff encased roberval.

Figure 19. $\triangleleft\triangleleft$ oz 1 and oz $\frac{1}{2}$ solid brass knobbed cylinder weights. These knobbed weights are very uncommon, being from Mordan's rare encased roberval, as shown above in Fig. 18.

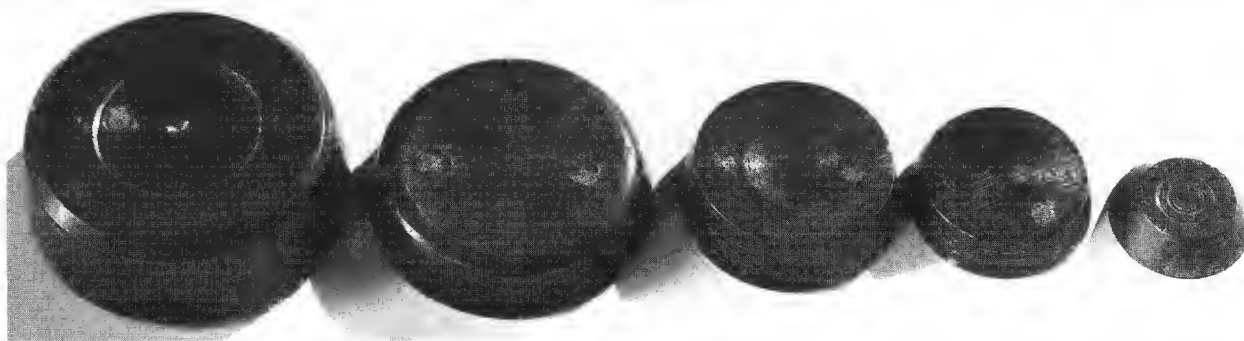


Figure 20a & 20b. $\Delta\Delta$ Set from GRAMMES 100 down to GRAMMES 5 solid brass, erratically made. The rims are not in proportion to each other. Possibly made at Mordan & Co's factory at 19 rue des Pyramides, Paris (mentioned in the booklet *S Mordan & Co* by E Eldred.) Note the one or two minute circular inserts of lead in the bases.

Fig. 21. $\nabla\nabla$ oz 1 & oz $\frac{1}{2}$ cylinder weights, oz $\frac{1}{2}$, F & F & oz $\frac{1}{4}$ top-knots showing various profiles.



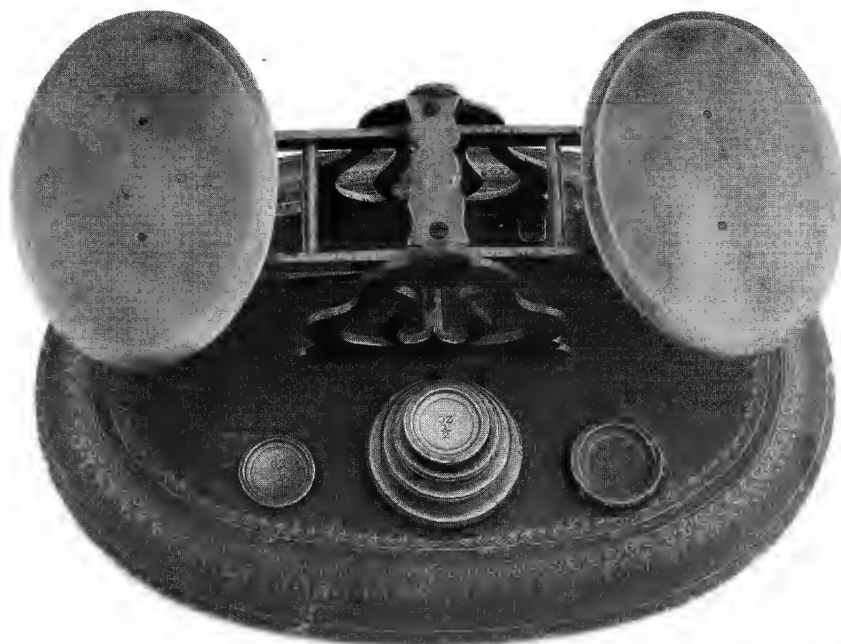


Figure 22a. ▲▲ Mordan letter scale with gilt-tooled red leather covering the wooden base.

Figure 22b. >> The special holes, lined with a soft fabric, of exactly the right size for the weights, oz 4 down to oz $\frac{1}{2}$ stack plus oz $\frac{2}{3}$ & oz $\frac{1}{3}$ in own holes. The small weights do have an inner rim, being over $\frac{1}{4}$ oz.



Figure 25. ▲▲ oz $\frac{1}{4}$ Solid silver, hallmarked for 1878. It has the lion passant, the leopard's head, Capital D in a shield [1878] and Queen Victoria's head with the maker's mark WT in an oval. No inner rim.

A solid silver scale by Mordan has the silversmith's mark for G-B & S and the date mark for 1925. Two silver Mordan scales on the ISASC website are dated 1910 and 1911.

Figure 23. >> oz $\frac{1}{4}$ Solid brass, gilded. No inner rim.



Figure 24. ▲▲ F/P solid brass. No inner rim. It is a contradiction to assume that an F weight [$\frac{1}{4}$ oz] weighs one Postage [$\frac{1}{2}$ oz], so we must look for an alternative interpretation. Could Mordan have used FP as an abbreviation for "Foreign Post"?

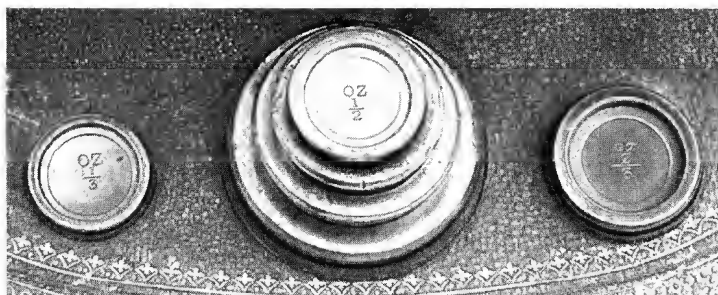


Figure 26. << oz 1 Solid brass, originally gilded. Decorative 'square and dot' design engraved on the rim. Mordan matched the engraving on his weights to the engraving on the scale. No example of this dainty engraving has been seen on a scale.

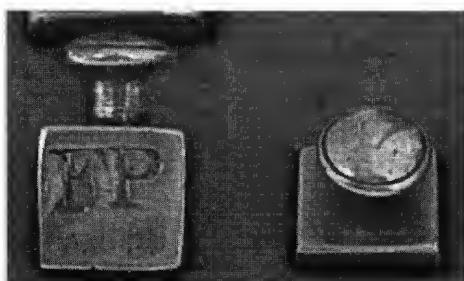


Figure 27a and 27b. ▲> 16P down to two weights of FP. These true cube weights are only found on Mordan scales (other makers having tapered cubes). The knobs are knurled. All examples seen of Mordan's cubes have been made of solid brass. The whole scale is shown on EQM page 944.

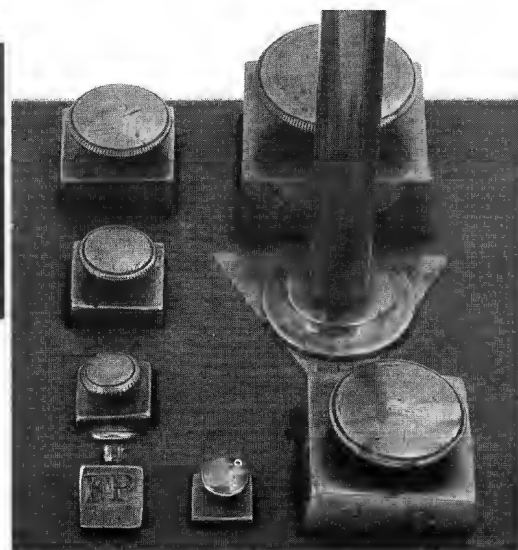




Figure 28a & 28b. \blacktriangleright 8/P, 4/P, 2/P, 1/P and F. Decorative floral engraving on the rims. Solid brass, originally gilded. No inner rim on the F weight. Note that the engraving on the weights matches that on the scale. Whole scale shown EQM page 936.



Figure 29. \blacktriangleleft Mordan seems to have been the only maker who provided, very occasionally, a hole under the 2 lbs weight to store the weights below 1 lb. See the photograph of this half-roberval with hanging pan in David Thomas' article Figure 12, page 3003.

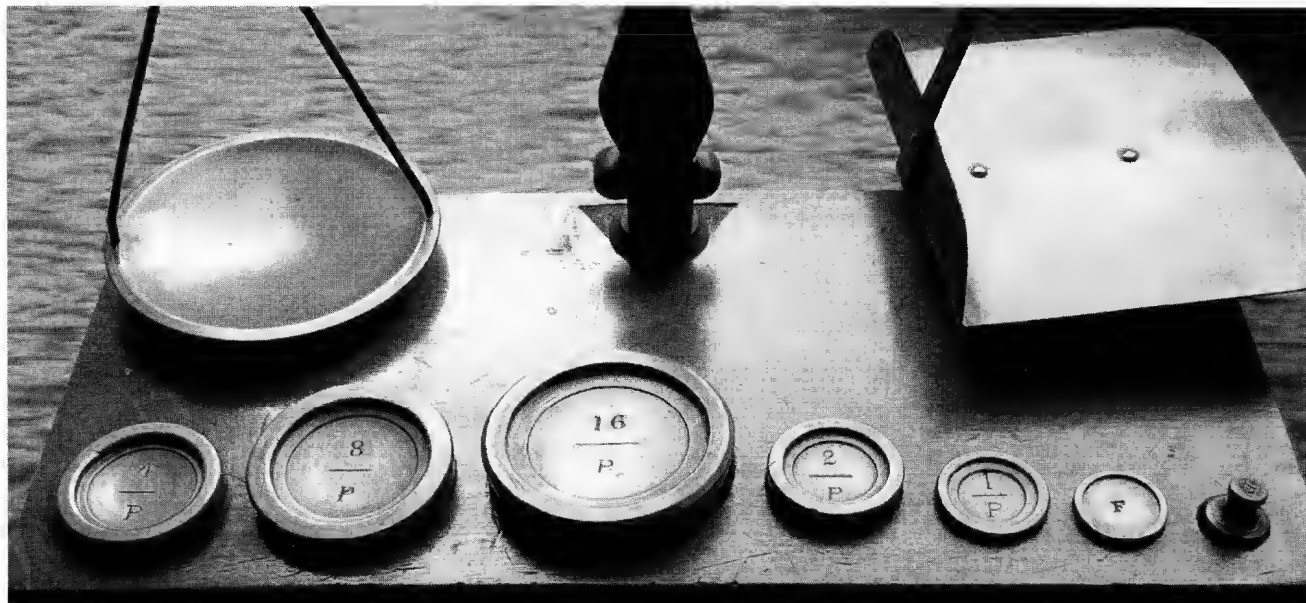


Figure 30. \blacktriangle 16/P, 8/P, 4/P, 2/P, 1/P, F and F weights, none cased. Mordan usually placed the largest weight on the left when placing them in a row, but in this case, he has placed the weights to allow space for the weight pan and the letter plate.

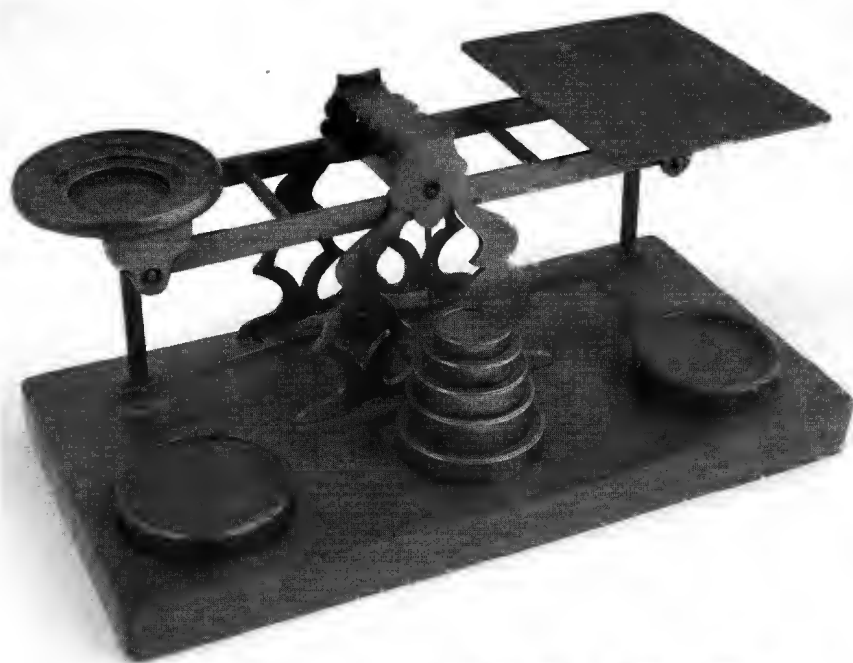


Figure 31a. << Scales with unusually complete weight stack, oz 12, oz 10, oz 8, oz 6 and oz 4 are all cased. Smaller than oz 4 the weights are solid brass down to oz 1.

See the comment under Figure 3 about weights going up in 2 oz increments.



Figure 32a and 32b. ^^ 4/P solid brass. It has a very large lead plug.

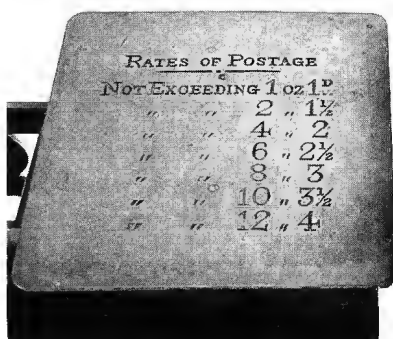


Fig 31b. & 31c. ^^ Each and every Postage rate on the scale-pan is matched by weights of the same denomination so no sub-divisions of the ounce are needed.



Figure 33. ^^ oz 16 cased weight, seamed at the top, nickel-plated.

Figure 34. >> This scale too has postage rates on the pan, the same as the rates on the scale shown in Figure 31b, but they are not matched by the weights. The user had to use multiple weights to discover some rates.

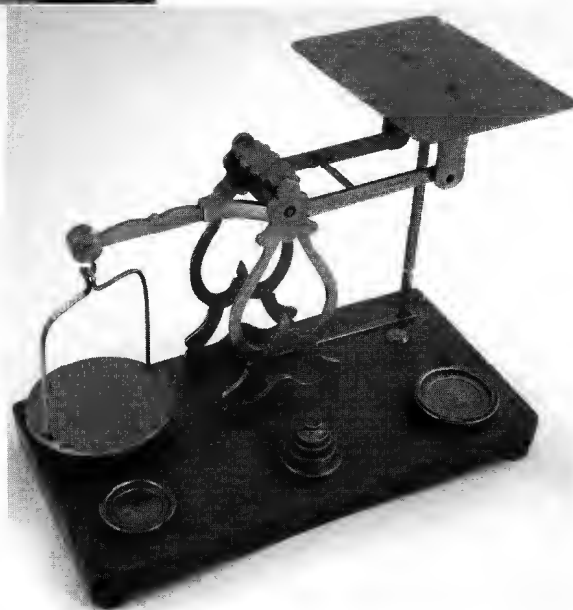


Figure 35. >> P weights for 8/P, 4/P, 2/P, 1/P, F and F. One way to solve the problem of the stack of weights blocking the view of the A-frame and the pointer was to have the weights in a fitted drawer. This is the only Mordan example of a drawer for weights known to the author.

Mordan and his descendants were making scales and weights for 100 years, except that they got silversmiths to make some of their solid silver scales and weights. Having seen so few silver scales, and some having rubbed marks, we can record only two 'external' silversmiths' marks, **WT** and **G*B & S**. The solid silver scale, shown on EQM page 2281, was made in Mordan's own workshops in 1920/21, as was the scale shown on page 1678.



Figure 36a. << This Mordan travelling scale is probably 20th century, having highly polished parts. Compare it with the scale in figure 15a, which probably predates it by about 50 years. The scale sits on a thin base that slips across the weights, forming a lid that traps the weights. The material might be German silver, or possibly chrome plating. See figure 36b on the next page.



Figure 36b. ▲▲ Weights from the travelling set shown in figure 36a. The weights are stamped only with the mass, 2 oz, 1 oz, $\frac{1}{2}$ oz and $\frac{1}{4}$ oz. The weights are not the older design with an inner rim, but instead have a flat top, with a groove with oblique sides into which the user slides his nails to lift the weight. The material seems to be highly polished nickel-plating or chrome-plating, much admired during the 1930s.



Figure 37. ▲▲ This Mordan weight has been modified. A later owner probably wanted it clear that it was a 4oz weight, but had only a stamp for a large O and a small z. Originally gilded.



Figure 38. ▲▲ This Mordan weight has been stamped by Mordan, with the weight and the price of posting, so was made between 1871 and 1897. Cased, with the join at the bottom of the sides.



Figure 39. ▲▲ This weight is a puzzle. It is just possible that Mordan stamped all three units on this weight, as the layout seems spaced intentionally. In the centre is 4/P, with oz/2 on the left, and D/1 $\frac{1}{2}$ on the right. This inclusion of weight, postages and price was very useful, but could only be applied to larger weights.



Figure 40. << These two sovereign weights are another puzzle. They are the conventional shape of bullion weights used in banks, with no inner rim. Were they made by Mordan? The stamp on the 20 sovereign weight, oz/5 with DWT/2 $\frac{1}{2}$ looks like Mordan stamps. Similarly, the stamps on the 10 sovereign weight look like Mordan stamps, oz/2 on the left, and DWT/11 $\frac{1}{4}$ on the right. No examples of scales appropriate to such sovereign weights are known.



Figure 41. ▲▲ This partners' scale has to be one of the rarest postal scales ever made by Mordan. It was designed to sit in the middle of a large desk, at which partners sat facing each other. Each partner had a pen rest and a set of weights on his side of the scales and Bristol-blue bottle of ink on his right of the scales. The blue glass contrasted delightfully with the gilded brass scrolls. See the Cover for a top view of the scales. The two sets of weights are identical.

Perhaps it is too much to ask that they should have had consistent 'rules' over such a long period. However there are some comments to be made about Michael Robinson's classification of Mordan's Weight Characteristics on page 3022:

Rules	Exception
<ol style="list-style-type: none"> 1. Mordan's weights, of whatever form or denomination, are of consistently good quality. 2. The outer rim is flat 3. The outer rim lacks concentric rings 4. Lead-filled cases were used for 4 oz & above 5. Cased weights were seamed at the bottom 6. Flat round weights had an inner rim 7. OZ was stamped above the number 8. Mordan made all his scales in his own work-shops 9. Weights for 6 oz, 10 oz, 12 oz & 16 oz (Figure 31) were made by Mordan only. Mordan was also the only maker of 3 P (Figure 13) and FP weights (Figure 24) 10. An inner rim was used by Mordan only 11. Weights marked in P for Postages were made by Mordan only. 	<p>except for their gramme weights, (Figure 20.)</p> <p>except for the domed rims, (Figures 10, 11, 12)</p> <p>except those with concentric rings, (Figures 4 & 5)</p> <p>except for some 4 oz (Fig.11) and 6 oz weights.</p> <p>except those seamed at the top (Figure 1 & 35)</p> <p>except for 1/4 oz weights (Figure 23.)</p> <p>except for tola weights (Figures 6 and 7.)</p> <p>except for some of his solid silver scales.</p>

I haven't seen the last three rules broken, YET!

Acknowledgements

With thanks to David Thomas, Robert Stein, Judy Soslau and Brian Brass for photographs and information.

Orlando W. Bedell and the Zenith Egg Grading Scale, Part 1

BY CHARLEY AMSBAUGH

Since he was kind enough to put *Zenith Egg Grading Scale, Mfg by O.W. Bedell, Earlville, N.Y.* on the egg scales he made, we know who made the Zenith and where, at least in the beginning. Unfortunately, that was about all any of us egg scale collectors had been able to learn about Bedell and the Zenith Egg Scale, until recently. As my collection of Zenith Egg Scales expanded, I observed five different versions and arrangements of words in the labels which were cast into the top left side of the base. But what factors had been at work that caused such changes in the labels? After all, the label was part of the cast iron base, so making changes was not an easy task. Were those changes made by Bedell, or did they perhaps indicate changes in ownership of the patent and production rights? Lots of questions, very few answers.

Last fall, when my wife and I made our annual visit to Central New York, where she grew up, I decided to visit Earlville and see what I could find out about Mr. Bedell and his egg scale. After a 60-mile drive through the heavily wooded hills of east-central New York State, I arrived in the quaint little Village of Earlville, which advertises itself as "Smalltown USA."

I stopped at the Village Office, where I explained my mission to Joyce and Bill. Bill himself remembered Mr. Bedell, and was quite certain he had been making the Zenith Egg Scale well before World War II, but he wasn't sure exactly when. Joyce and Bill agreed that Mr. Gordon Dresser would be about the best person for me to talk to, so they gave me his phone number and off I went.

They were absolutely right about Gordon Dresser: he was as generous with his time as he was knowledgeable about Mr. Bedell. He put aside whatever he had planned for the day and showed me around Earlville's Quincy-Square Museum, which is housed in an old church building just down East Main from the Village Café. He took the Zenith Egg Scale shown here (Figure 1), with Bedell's name on it, from a display case so I could take some pictures of it, since that was obviously what I was interested in. Then we sat down to talk about Mr. Bedell for awhile. Although he hadn't known him personally, Gordon remembered Bedell quite well. He thought Bedell had been making the Zenith Egg Scale in the 1930s and 1940s.

Since the only thing I knew about Bedell until then was that he manufactured the Zenith Egg Scale, I was surprised to learn that he was more famous for making split-bamboo fly rods for fishing than he was for the Zenith Egg Scale, at least in that area. In fact, his egg scale manufacturing business was actually just a sideline to his other interests, which included keeping bees and selling up to 20 tons of honey per year, in addition to making fly rods. Gordon showed me one of Bedell's split-bamboo fly rods and then went to the back of the room and pulled out a sign reading *HONEY – we produce it, we sell it*. Across the bottom, it read *O.W. Bedell, North Main St., Earlville, N.Y.*

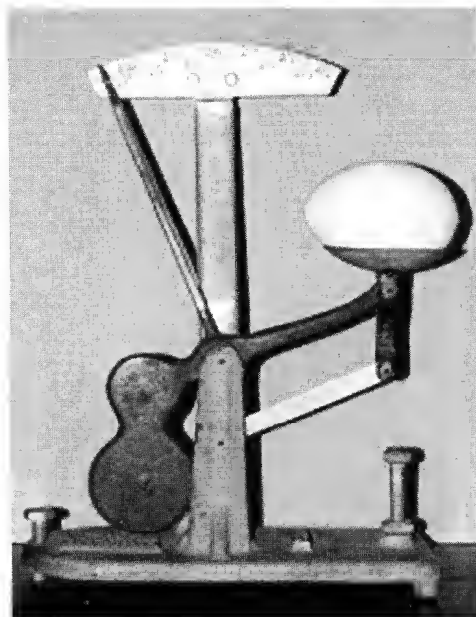


Figure 1. ▲▲ Zenith Egg Scale

As it turned out, that honey sign wasn't the only surprise Gordon had in store for me. He knew exactly where Bedell's house was, over on Taylor Avenue, and offered to take me there. When we arrived at the old Bedell home at 5 Taylor Avenue a few minutes later, I started taking pictures, first the Bedell home, a workshop out back, where we supposed he had made his egg scales, and an old Quonset hut next door that Bedell used to own. Just as we were getting ready to leave, an elderly gentleman named Charlie Crandall came by to visit his son, who now operates an auto repair shop in that Quonset hut at 7 Taylor Avenue. Charlie, too, remembered Bedell and was certain that it was in the workshop behind the house where Bedell had made the Zenith Egg Scales. So, that settled the question of exactly which building was used for manufacturing the Zenith. Charlie also remembered that the farm supply company in Earlville, where he worked at the time, was selling Zenith Egg Scales in the late 1950s.

Next, Gordon took me to see Harry Conley. Harry also remembered Bedell and thought he was making Zenith Egg Scales as far back as the 1930s. I soon learned that Harry was the Superintendent of the West Hill Cemetery in neighboring Sherburne, NY, which is where Bedell is buried. Harry produced cemetery records showing that Orlando W. Bedell was born in 1873 and died on September 13, 1961, at the age of 88. Harry also brought out a map of the cemetery and showed us where Bedell's grave is located. Gordon and I got back in his pickup and drove to the West Hill Cemetery to visit the plot where O.W. Bedell, his wife and daughter are all buried. Gordon then took me back to the museum, where we parted company.

Thanks to the generosity of a man named Gordon Dresser, who is by far the best tour guide I have ever had, I got to meet four people who personally knew O.W. Bedell when he was alive, see the Bedell house and workshop, visit his grave, and learn an awful lot about the man and his egg scale. I was so thrilled with the way my quest had turned out, I could hardly wait to get back to my brother-in-law's to tell him all about it. After all, he and the Zenith Egg Scale he had inherited from his grandfather were responsible for my getting started collecting egg scales in the first place.

When I finally got back and told him about everything that had happened that day, my brother-in-law was duly impressed with how well my visit to Earlville had gone. He then produced the final surprise of what for me was an amazing day. He had sent an email to Earlville a couple months earlier, inquiring about O.W. Bedell and the Zenith Egg Scale. You can imagine my amazement as I read the reply he got from Richard Eades, President of Earlville's Quincy-Square Museum Association. Here's what I learned about Bedell and the Zenith Egg Scale, that wonderful day in September and in my research since:

Orlando W. Bedell was born in Staten Island, NY, on December 17, 1873. He married Miss Janet Kesner in June 1904. They had one child, Fannie Singleton Bedell, born in Staten Island in 1907.

He served as a mechanic with the Mosler Safe Co. and with the Ely Morris Safe Co. in Perth Amboy, NJ, and in Philadelphia, PA, for many years.

Bedell bought an apiary in Earlville and moved his family there in 1916. His beekeeping activities expanded until he had about 400 hives and was shipping up to 20 tons of honey annually.

Following his retirement from the beekeeping business, he was self-employed in various businesses,

one of which was the manufacture and sale of the Zenith Egg Grading Scale, which he apparently produced from the 1930s, [as the men I talked to recall,] until failing health made him retire from the egg scale business in 1948.

When he stopped making egg scales in 1948, Bedell sold the patent and production rights for the Zenith Egg Scale to the Cooperative Grange League Federation Exchange, G.L.F., or simply the Grange, which later became Agway, as attested to by his old neighbors in Earlville, Gordon Dresser, Harry Conley and Dick Eades.

The Grange was advertising the Zenith Egg Grader for \$3.95 in their 1953 catalog.

The box for the Zenith Egg Grader made by the Grange in Earlville includes the caption, "manufactured by Cooperative G.L.F. Exchange, Inc."

Charlie Crandall recalls that the farm supply company he worked for in Earlville was selling Zeniths in the late 1950s.

Bedell died at his home at 5 Taylor Avenue, Earlville, NY, on September 13, 1961. His daughter died in 1965, and his wife in 1976. They are all buried in lot no. 500, West Hill Cemetery, located on NY Route 80 just west of Sherburne.

I recently bought a "brand-new" Zenith Egg Grader with a dark gray painted cast iron base and instructions in its original box. The instruction sheet indicated that the grader was "manufactured by N.L. Pratt, R.D. #3, Lowville, N.Y. 12701." The box had a postmark of 1964. Apparently, the Grange had sold the patent for the Zenith Egg Scale to N.L. Pratt of Lowville, N.Y., presumably about 1960.

Personal observation of seven different labels on Zenith Egg Scales/Graders:

1. "Pat. Applied for" paper label on unpainted gray pot metal bases (Figure 2).
2. Post-patent paper label on unpainted gray pot metal bases (Figure 3).
3. Full Bedell label cast into light blue cast iron base (Figure 4).
4. "Mfg. by O.W. Bedell" missing from original full Bedell label on light blue cast iron base (Figure 5).
5. Zenith Egg Grader underlined (not Egg Grading Scale), Earlville, N.Y., U.S.A. on light blue cast iron base (Figure 6).
6. Zenith Egg Grader label upside down on dark gray painted base (Figure 7).
7. Zenith Egg Grader underlined with label right side up on dark gray painted cast iron base (Figure 8).

ZENITH
Egg Grading Scale
Pat. Applied For
MANUFACTURED BY
O. W. BEDELL
EARLVILLE, N.Y.
(paper label)

Figure 2

ZENITH
Egg Grading Scale
MANUFACTURED BY
O. W. BEDELL
EARLVILLE, N.Y.
(paper label)

Figure 3

ZENITH
EGG
GRADING SCALE
MFG. BY
O.W. BEDELL
EARLVILLE, N.Y.
(blue cast iron base)

Figure 4

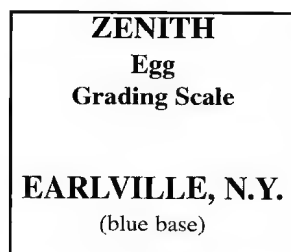


Figure 5

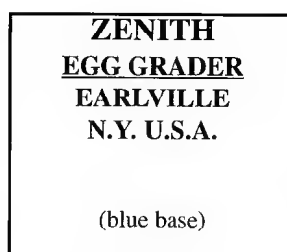


Figure 6

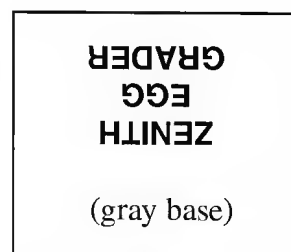


Figure 7

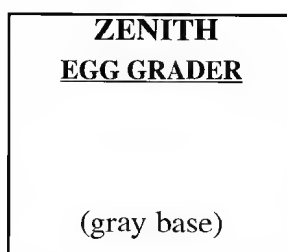


Figure 8

So, what does all this mean to those of us who collect Zenith Egg Scales? For openers, it means the Zenith Egg Scale was manufactured by at least three different parties: by O.W. Bedell in Earlville from the early 1930s, according to anecdotal evidence, until 1948; by the Grange in Earlville from 1948 until probably about 1960; and thereafter by N.L. Pratt somewhere near Lowville, N.Y. The Zenith Egg Scale evolved through several different models before Bedell settled on the final design he would carry into production, so various versions of the Zenith were produced by Bedell. Careful examination and comparison of the labels on various models shows a definite pattern, which I interpret as follows:

His pre-patent models carried a paper label indicating the patent had been applied for (Figure 2). Once the patent was issued, he apparently continued using the paper label without any reference to the patent (Figure 3), until he switched from pot metal to cast iron for the base and cast his label right into the metal on the top left surface of the base (Figure 4). In addition, each time the Zenith production rights changed hands, changes were made in the label. For instance, when he sold the patent and production rights to the Grange, Bedell's name was removed from the Zenith, thus creating two more versions, one with his name removed from the "Bedell label", probably by filling in the words "MFG. BY O.W. BEDELL" in the original pattern, thus leaving an empty space (Figure 5), the other with a new label calling it the Zenith Egg Grader (Figure 6), with the words "Egg Grader" underlined. Although ownership had passed from Bedell to the Grange, the Zenith continued to be manufactured in its hometown, so "Earlville, N.Y." was retained and "U.S.A." was added to the label for the first time. Then ownership changed hands again, so, when Pratt acquired the patent and production rights for the Zenith Egg Grader, he changed the color of the base from blue to dark gray and, due to a mistake when Pratt's new label was created, two more versions of the Zenith Egg Grader appeared, one with the label upside down (Figure 7), the other (Figure 8) continuing the Zenith Egg Grader label without any reference to "Earlville, N.Y." At least that's my interpretation of the seven different labels that appeared in the lifetime of Bedell's Zenith Egg Grading Scale.

Editor's note: Part 2 of this article will appear in the next issue of EQM.

The Fairbanks Brothers and their Scale Works

BY H. BROOKE PAIGE

for the 175th Anniversary of Thaddeus Fairbanks Invention of the Platform Scale.

The Pioneering Spirit

In 1790, Joseph F. Fairbanks and his young wife Phebe left the comfortable, civilized community of Dedham, Massachusetts and moved southwest to the little town of Brimfield, Massachusetts, in the Connecticut River valley, where they purchased a sixty-acre farm. They had three sons: Erastus, born in 1792; Thaddeus, born in 1796; and Joseph P., born ten years later in 1806.

By 1814, Major Joseph F. Fairbanks was eager to explore the new opportunities that might await in northern Vermont. His oldest son Erastus had joined his uncle's law practice in St. Johnsbury two years before. At the urging of Phebe's brother, Ephraim, the Major decided to sell the farm. In the spring of 1815, in a sturdy green one-horse cart that Thaddeus had designed and built, the family left the "thickly settled" town of Brimfield, traveling north along the Connecticut River valley to St. Johnsbury, Vermont. Thaddeus was nineteen and Joseph P. was nine years old.

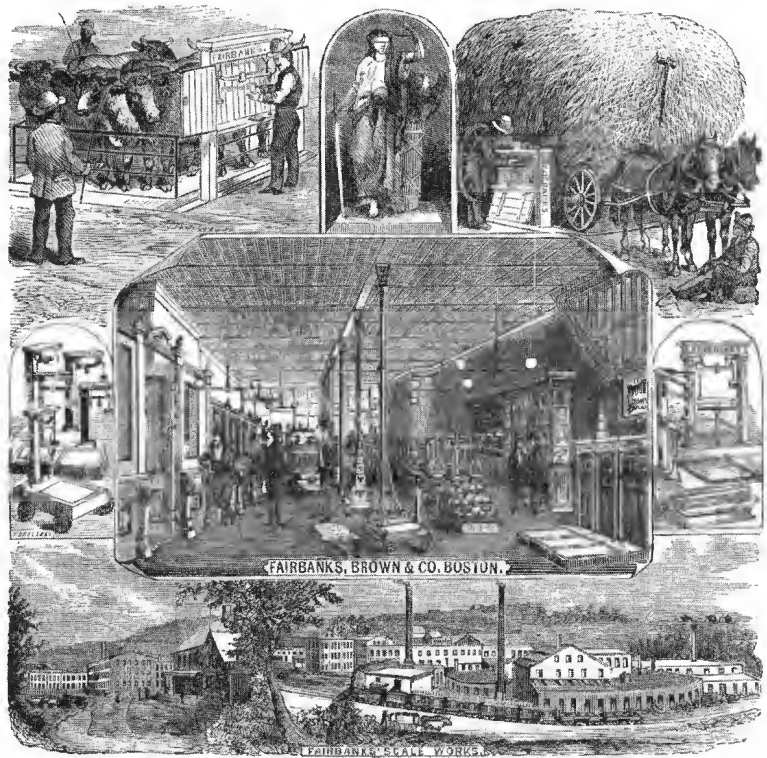
Starting a New Life

In 1815, St. Johnsbury was a small village in the wilderness with about 1,300 inhabitants, and northern Vermont had wide pastures for farming.

The Major invested \$300 of the family's \$2,000 savings to buy 5.5 acres of land along the Sleeper's River, which included the rights to a dam site in the river. He and Thaddeus first built a home for the family, and by year-end; they had built and were operating a sawmill and a gristmill.

In a countryside where opportunities were made rather than found, they were entrepreneurs, trying a number of ideas that might bring them success above and beyond the modest income from the two mills. Thaddeus had always been a tinkerer—an inventor—designing and building wagons even as a teenager in Brimfield.

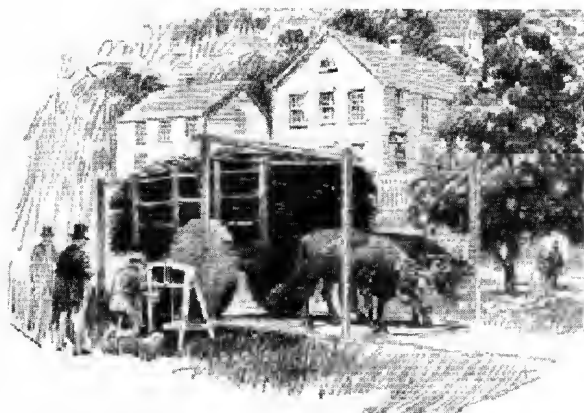
In 1823 Thaddeus acquired an iron foundry from his cousin Huxham Paddock. The Fairbanks Iron Works was established for the manufacture of "stoves, plows, and whatever else anybody wanted." Business was good, and in 1825 Thaddeus invited his older brother Erastus to become his partner. They formed the E. & T. Fairbanks Company to manufacture hoes, pitchforks, cultivators, plows and stoves using casting patterns that Thaddeus made. With their entrepreneurial spirit, it was not



surprising that the brothers became interested in other opportunities that came along.

Foundations of the Scale Works

In the late 1820s, the invention of the hemp breaker made hemp straw an economically viable crop for farmers, and many in Vermont began growing it to meet the demand. In 1829, the Fairbanks with seven partners started the Passumpsick Hemp Works to buy and process the locally grown hemp straw. Thaddeus designed and built three enormous machines for dressing the hemp—that is, for breaking the hemp straw into individual fibers or strands. Erastus edited and published a series of agricultural articles about cultivating hemp to encourage farmers to grow it.

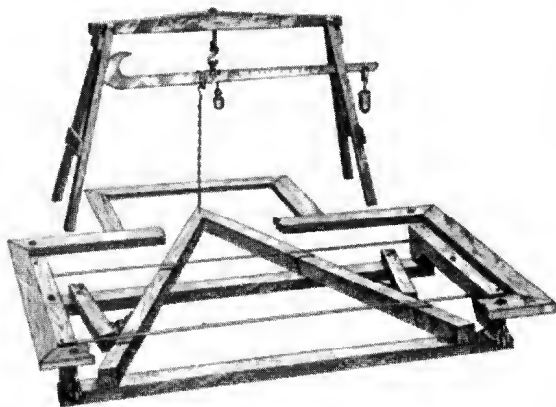


Weighing hemp on an early Fairbanks platform scale.

The idea for [his] platform scale came to Thaddeus out of necessity. Hemp straw was purchased by weight. Since Roman times, a wagonload of goods could only be weighed by attaching chains to its axles and suspending it from a beam. At first, Thaddeus used a crudely-made balance beam from timber; he chained the wagon to the short arm of the beam and added weights on the long arm until the “scale” balanced. This method was accurate to within about fifty pounds, but hemp was a valuable and expensive item – costing as much as \$15 per ton at one point. The process of weighing it therefore required a much greater degree of precision and a method that was less cumbersome and time-consuming.

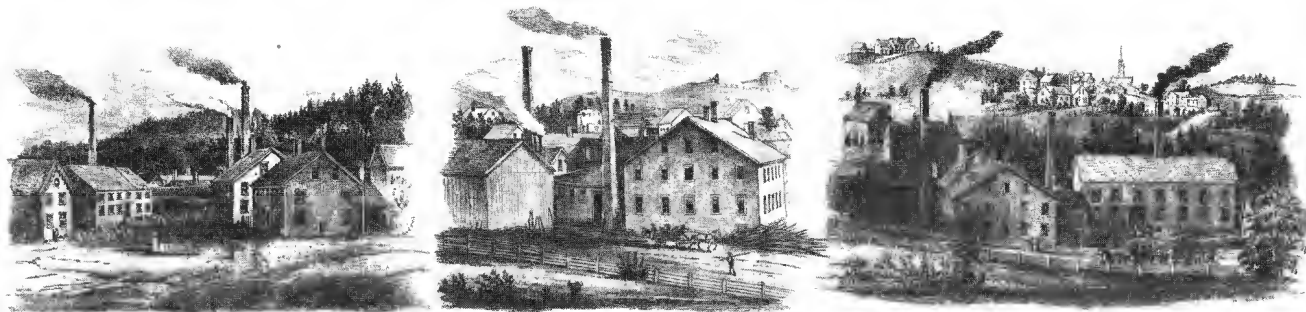
Through an arrangement of levers, Thaddeus devised a way to reduce the amount of weight needed to counterbalance a load to just a fraction of what had been needed before. He then determined that, rather than having to hoist the wagon to weigh it, it would be more efficient to have a device with a platform onto which the wagon could be driven. The skills that Thaddeus had acquired from years of wagon making, blacksmithing, carpentry, sawyering, and casting iron were all the skills he needed to transform his idea and drawings into a working model.

His first design was an arrangement of two long levers with a platform balanced in the middle. The device was to be set into a pit, making the platform level with the ground so that the wagon could be driven directly onto it. This design, however, was not stable, and the platform and its load would rock from side to side.



Fairbanks first platform scale was issued patent no. 123.

Thaddeus determined that, by adding two short levers to the long ones, he would create support points at all four corners of the platform rather than in the center. His newly designed platform scale was not only accurate but it was also very stable. He prepared a patent application to protect his idea for the weighing machine, and in 1830 he went to Washington, DC to



E. & T. FAIRBANKS & CO. SCALE MANUFACTORY.
Views from the 1853 Map of St. Johnsbury Vermont by Preslow and Edwards.

file it with the United States Patent Office.

More than a "Hay Scale"

At the same time, E. & T. Fairbanks was modestly successful because of a number of enterprises—especially the manufacturing of swallowtail cast-iron ploughs and the famous Diving Flue Cook-Stove, a large deep-bellied box stove judged to be "the most effective cooking apparatus then obtainable." Thaddeus had designed both. The hay scale became one more of the company's products. In fact, Thaddeus told his wife Lucy that he had come up with "an idea [the platform scale] that probably won't be worth more than a thousand dollars or so."

Thaddeus believed that his hay scale could be sold to towns along the Connecticut River in Vermont and New Hampshire. He did not immediately realize the profound impact his design would have on commerce and the important role that he and his brothers would play in the development, manufacture and distribution of this new technology.

E. & T. Fairbanks Scale Works

The demand for the Fairbanks platform scale was strong. Customers as well as Fairbanks sales agents in the field asked for new sizes and new designs to be made for new applications.

In 1833, Joseph P. was invited by his brothers to join E. & T. Fairbanks. He said he had been offered "the privilege of riding around the country and peddling out Hay scales." His territory was the state of Maine and he settled in Waterville where he established a small business manufacturing plows, hoes and pitchforks while serving as the local agent for Fairbanks Scales. He and his family divided their time between Waterville and St. Johnsbury until 1839, when Thaddeus and Erastus prevailed upon him to give up his own venture and return to St. Johnsbury to direct the sales activities of their rapidly expanding business.

The variety of scales based on Thaddeus's original lever design grew rapidly—from tiny postal scales to the great barge weighlock built by Fairbanks for the Erie Canal.

By 1860, the company was selling its scales throughout the Caribbean, South America, India and Russia. In 1876, the

Fairbanks Patent Scales advertisement.

FAIRBANKS' PATENT Scales

AT REDUCED PRICES.
Adapted to every required operation of weighing, as
Warehouse Scales, for
Grain, Portable Scales,
Stone Scales,
Counter Scales, &c.
Barge Scales.

THE STANDARDS.
The undersigned have recently received from their Branches in Water Street, to the spacious Store, No. 189 BROADWAY, N.Y., and have added to their Stock a complete assortment of GOLD and SILVER SCALES and WEIGHTS, PATENT BEAMS, SPRING BALANCES, POST-OFFICE SCALES, &c., and our office is permanently at wholesale and retail, the most complete assortment of Weighing Apparatus to be found in the United States.

FAIRBANKS & Co., No. 189 Broadway, New York.

company was manufacturing almost three hundred types of scales that had been adapted to the various needs of business and commerce. Because Fairbanks had pledged to modify any of its stock scales to meet a customer's unique requirement, its office files were filled with thousands of drawings and designs, and its store rooms held tens of thousands of patterns for their construction.

Overcoming Obstacles

In his doctoral thesis entitled, *Ingenious & Enterprising Mechanics: A Case Study of Industrialization in Rural Vermont – 1815-1900* published in 1995, [ISASC member] Dr. Allen Yale discusses the obstacles that the geographic location of St. Johnsbury posed for the Fairbanks brothers' operation of the scale works.

Fairbanks Scale Works needed a wide variety and growing quantity of raw materials for manufacturing. Once the scales were made, the company had to distribute them beyond the local market. Initially the region was able to provide small quantities of iron and copper ore needed, but the company's need soon was far above what native resources could provide.

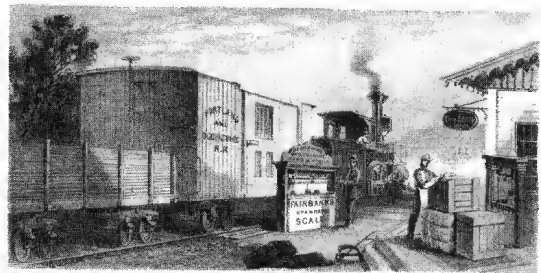
The lack of transportation was a major obstacle to the company's expansion. Without railway or navigable waterways close at hand, wagons—and sleds in winter—were the only way of moving raw materials and finished goods to and from the growing factory. Wagons carried the goods to Burlington, Vermont where they were loaded onto schooners to be transported on Lake Champlain to the Erie Canal and beyond. Finished goods were also carried by wagon down stream to the navigable portion of the Connecticut River for customers in southern New England and Boston. Raw materials and finished goods were also transported between St. Johnsbury and Boston by wagon.

In November 1850, the first steam train arrived in St. Johnsbury. E. & T. Fairbanks finally had a reliable, year-round way to bring raw materials to the facility and move finished scales from St. Johnsbury to most of New England, especially the ports of Boston and New York.

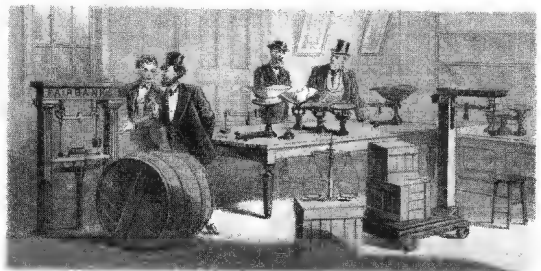
Pioneering Sales and Marketing Strategies

The genius of the Fairbanks story was the company's product innovation and service to customers and field sales agents, responding rapidly to unending requests for new designs to satisfy new weighing applications.

But the company also brought to the marketplace new ways of advertising, selling, and distributing its products, giving it great advantage over the growing competition. Early in the 1830s, Thaddeus had contracts with independent sales agents to sell his scales in several



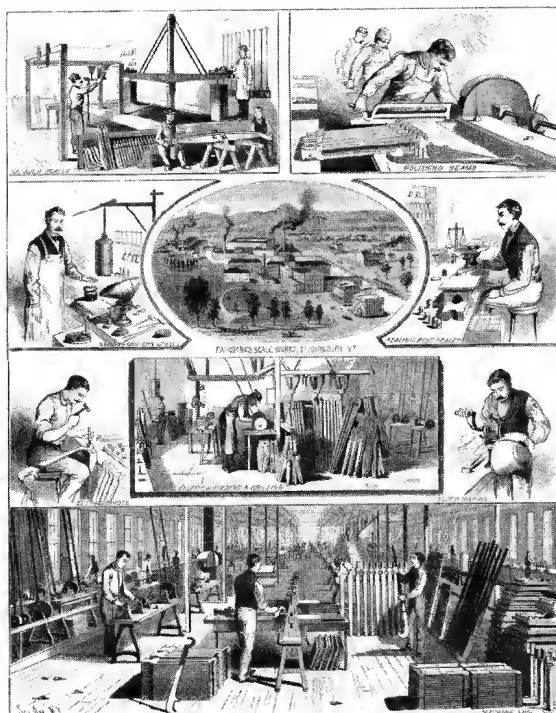
Fairbanks trade cards.



regions of the country. Agents were selected with great care, and they were furnished with detailed instructions, watercolor drawings and plans for each scale. They were trained to supervise the set-up of a new scale and to repair and maintain Fairbanks scales as well.

As business grew, the company opened regional sales offices and warehouses to be able to provide speedy delivery, installation, and service.

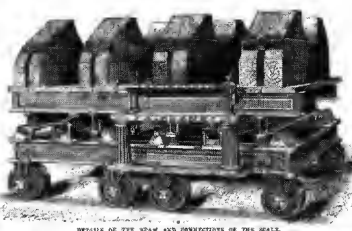
Fairbanks also pioneered the extensive use of advertising. Trade cards touted the "new" concept of commerce—that goods should be sold and traded based on weight rather than by volume measure or count. Advertisements appeared in most major trade publications and in consumer magazines such as *National Geographic* and *The Saturday Evening Post*. Product catalogues were compiled regularly and distributed at farm shows and trade fairs. Smaller catalogues targeting specific markets were also published. The company set up elaborate displays of its scales at public exhibitions and fairs around the country



Manufacture of Standard Scales - E. & T. Fairbanks in *Scientific American* November 6, 1880.

The Fairbanks 150 Ton gun scale of the Watervliet Arsenal as featured in *Scientific American* May 26, 1894.

THE NEW HUNDRED AND FIFTY TON PICTURED THE WEIGHING OF THE WATERVLIET ARSENAL. It is a fine thing that all modern cities in build upon the balance. Modern machinery developed the principle of gravity and when electric balance began to be used in the laboratory, in physics, which found the science of measurement, the same truth holds. All the modern developments are due to the mechanical construction of weights and measures. Of late years science has begun to build in the use of the mechanical scale. The changes of this and are for the most part, and of steel for the first time are now accurately weighed, and precise results in weighing are obtained by the use of scales.



The crane's beam for many other branches of the arts. We observe in our present from a portable platform scale, furnished by the Fairbanks Company, of New York, which is probably the largest of its kind in the world. It was designed and built by the firm of E. & T. Fairbanks & Co., of St. Johnsbury, Vt. It can be used in the Watervliet Arsenal, near Troy, N. Y. It has a rated capacity of 150,000 pounds. The scale is carried on eight 36 inch wheels, one set of four. From the front the lower end frame built up of 12 inch channels. Directly beneath which is a link, the spring is by whose action the gun is raised from the scale. From the right of these lower beams, four on each side. Above the

DETAILS OF THE BEAM AND CONNECTIONS OF THE SCALE.



THE ONE HUNDRED AND FIFTY TON GUN SCALE OF THE WATERVLIET ARSENAL.

and later at important international exhibitions in London, Paris, Philadelphia, and Vienna.

Fairbanks was among the first American companies to initiate a public relations strategy to keep its name and reputation in the press. News stories and feature articles lent credibility and objectivity to the company, enhancing its image and costing nothing. In 1880, it was recognized as one of the top American companies when *Scientific American* included E. & T. Fairbanks in its "American Industries" series and made it the cover story of the November 6, 1880 issue.

From a Family Organization to a Corporation

In 1874, E. & T. Fairbanks and Company was reorganized into a stock corporation, raising \$4.5 million in capital which was primarily invested back into the business. Sons of the founders joined the company in management and leadership positions.

By the end of the 1800s, Thaddeus' son Henry was the only family member still actively involved in the day-to-day operations of the company; he served until his



New Fairbanks Scale Works, St. Johnsbury, VT, 1967.

death in 1918. The Chicago sales branch—Fairbanks and Greenleaf—had been established in 1857, and Charles H. Morse, a young, ambitious apprentice at the company store in St. Johnsbury, was sent to work there. Morse eventually expanded and diversified the branch's product line, and he began assuming more of the active management, control, and decision-making functions at E. & T. Fairbanks. In 1916, Morse formed a partnership with E. & T. Fairbanks & Company and with the sales organization of the scale manufacturer, Fairbanks & Company, and called it Fairbanks, Morse and Company, the name that he had been using in Chicago for some time before then. That same year, Fairbanks, Morse and Company purchased the manufacturing operations and facilities of E. & T. Fairbanks & Company, including the scale works of St. Johnsbury.

The St. Johnsbury scale works continued to produce an amazing array of scales despite the fact that little money was being invested in the facility for maintenance, upkeep, and modernization. By the 1950s, the aging plant had become inefficient and much of its machinery was all but obsolete. In 1956, a hostile takeover of the company was initiated, and when the dust had settled two years later, it had been acquired and merged with Penn-Texas, one of the nation's first business conglomerates. The company's name was changed to Fairbanks-Whitney, Fairbanks Morse Weighing Division.

St. Johnsbury Rescues the Scale Works

In 1961, a rumor was heard that Fairbanks was going to move its operations out of Vermont and was actively looking for a new location. The people of St. Johnsbury rallied, deeply aware of the economic loss that would be felt by the town of 9,600 people without the company's annual payroll of \$2.6 million. They launched an aggressive community drive to raise \$250,000, which was 5% of the \$5 million needed to build a new scale works in town. If the goal could be met, the Area Redevelopment Agency would finance the rest of the cost. Volunteers made phone calls and rang door bells. Hospital patients were wheeled to phones to call in their pledges. When that goal was reached, the fund-raising committee immediately decided to double it. "If we are going to build the plant, we may as well equip it," said one resident. In April 1964, top management finally committed to build a 221,000 square-foot plant in St. Johnsbury and increase the number of employees there by 15%. Construction began in June 1966, and the first scales were built



St. Johnsbury Academy and South Hall.

there in April 1967.

In 1962, the election of George Strichman as president of Fairbanks-Whitney brought new management talent and vitality to the scale company.

In the 1960s, Fairbanks engineers began studying, designing, and adapting evolving “space age” technology and systems, as well as the emerging capabilities of electronic data processing, to develop accurate and reliable weighing equipment that would be electronically controlled.

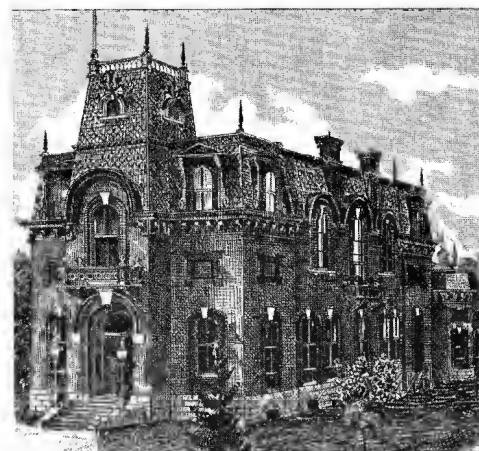
In 1964 the company was renamed Colt Industries after its Colt Firearms division, and by 1980, Colt had opened a second facility for manufacturing Fairbanks scales in Meridian, Mississippi. In 1988, a group of investors led by F. A. “Bill” Norden acquired Fairbanks Weighing Division from Colt Industries, and it was once again a private, independent corporation—now named Fairbanks Scales. Norden moved corporate headquarters to Kansas City, Missouri. In 1994, Norden’s son Rick joined the company.

The late 1980s and 1990s were a time of growth, innovation, and evolution at Fairbanks Scales. Ingenious and sophisticated new scales were developed that used to full advantage the emerging technologies of integrated circuits, fiber optics, mini-computers, printers, and digital technology.

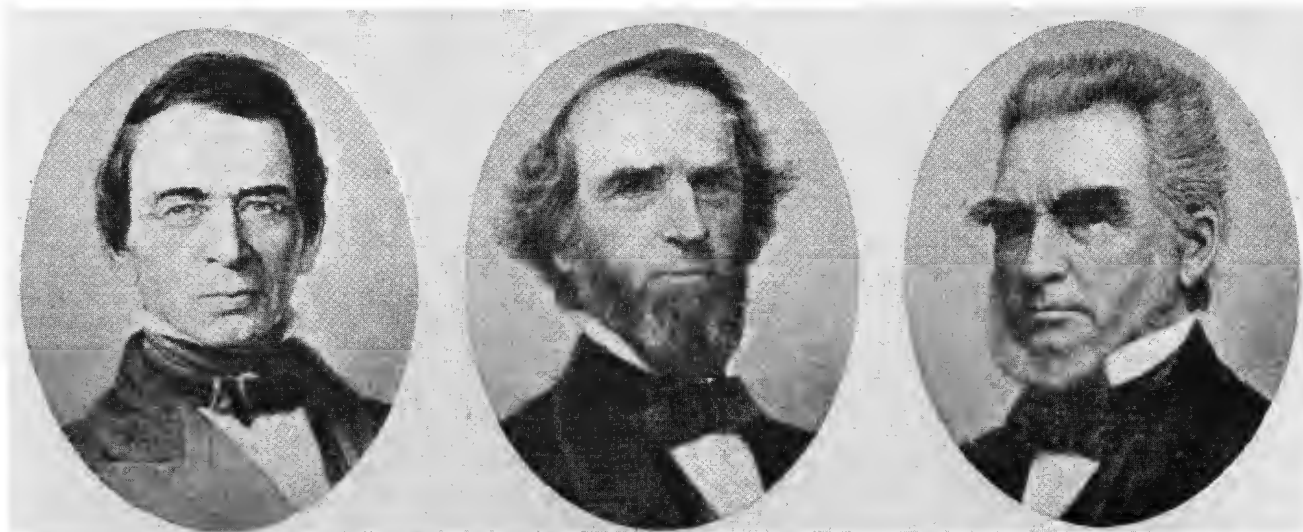
Despite the economic recession that began in 2001 and the instability following the September 11, 2001 terrorist attacks, Fairbanks Scales has continued to move ahead, certain that the world of trade and commerce will continue to demand accurate weighing and fairness in the marketplace—just as Thaddeus Fairbanks had prescribed 175 years before—so that “equity might prevail.”

More than Just a Business

In the 1800s, the Fairbanks family’s attitudes, religious beliefs, and self-image affected the way they



The Fairbanks Antheneum Library



The Fairbanks brothers, Joseph P., Thaddeus and Erastus.

ran the scale works and the manner in which they related to their employees.

Pay rates were considered generous for the mid-19th century, and many employees were able to save money and buy or build comfortable homes. In 1855 a library of 800 books was opened at the scale works for employees. On occasion, the company treated its people to lectures, prayer services, entertainment, excursions, gifts, and cash bonuses. The family sent flowers from its private conservatories to employees who were ill.

The company and individual members of the Fairbanks family also gave many gifts to the town of St. Johnsbury. The Fairbanks brothers founded St. Johnsbury Academy in 1842, and for the first forty years the company and family paid for all of its expenses.

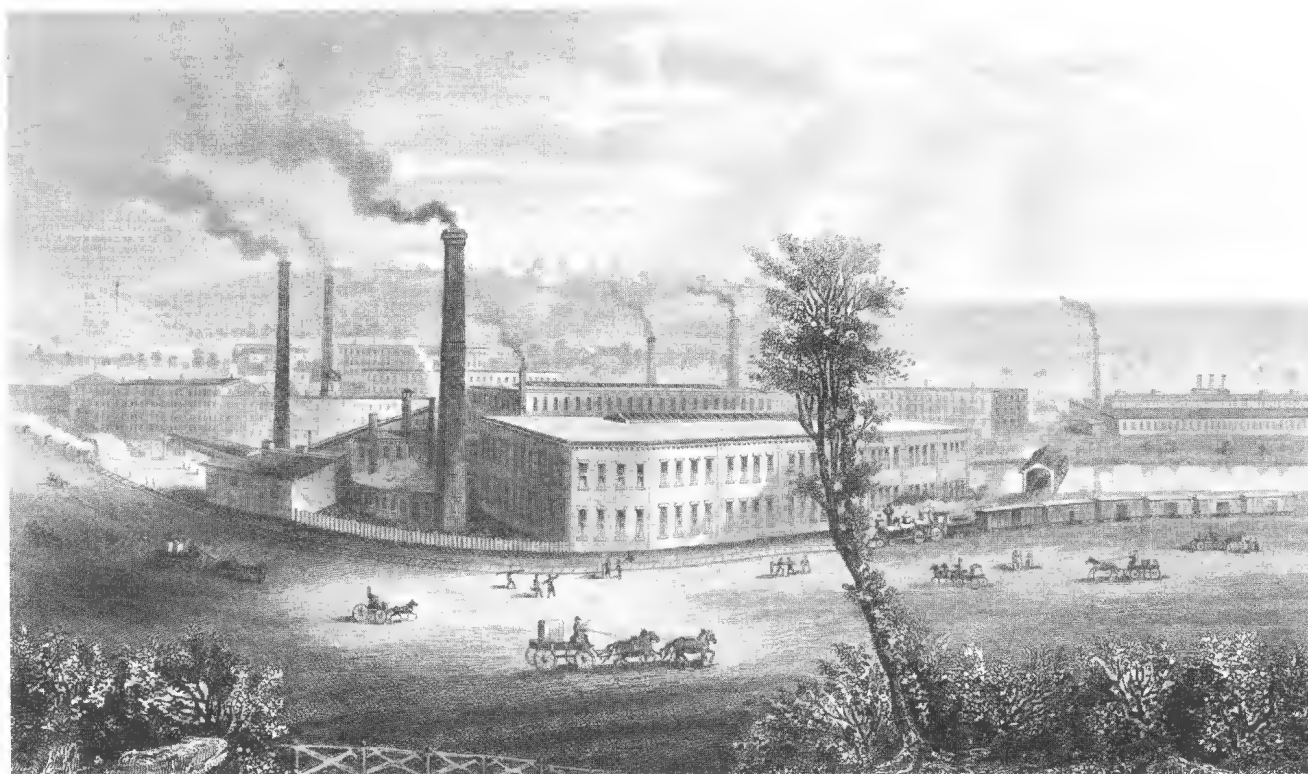
In 1871, Erastus's son Horace commissioned the Atheneum library and stocked it with 8,000 books. Two years later, he added a wing for an art gallery and acquired all of the paintings to be displayed. In 1884, Henry, son of Thaddeus, commissioned and donated a three-story YMCA building to the town. In 1891, Franklin Fairbanks, son of Erastus, built, equipped, and endowed the 10,000-sq. ft. Fairbanks Museum of Natural Science.

The beneficence of the Fairbanks family to St. Johnsbury and its people was widely recognized and appreciated. In the Winter 1980 edition of Vermont Life magazine, author Robert W. Morgan wrote: *As the Fairbanks wealth increased, so did the mutual esteem between them and the townspeople; vital statistics of St. Johnsbury and nearby towns shows a surprising number of children with the given names of Thaddeus or Erastus.*

The Gift of Invention

Thaddeus Fairbanks shared his family's spirituality and devout faith in God. He credited God for bestowing on him the gift of invention; he thanked God for giving him the idea for the scale. Despite many obstacles and setbacks, fires and floods, his perseverance never wavered. When others might have given up in frustration and defeat, Thaddeus kept going, taking each hurdle as he came upon it on his path to success. When the river flooded one spring, he simply opened the doors to the factory so that the water would run through it rather than destroying it.

Writing about the brothers in his contribution to *New England States: Their Constitutional, Judicial, Educational, Commercial, Professional and Industrial History* by William T. Davis, Rev. Edward Fairbanks observes: *With three such men, of different gifts, yet of one mind; of such strong character, of tenacious purpose and generous ideas, it is not difficult to account for the fine issue of their joint enterprise. The public soon learned that whatever bore the name of Fairbanks had on it the stamp of reliability. Stern integrity presided over the business, truth guided its affairs, honor entered into every detail of construction—as befitted an industry that was furnishing the world with standards of weight for business accuracy. From the first, every instrument constructed in these works embodied an ideal; it was more than a handy contrivance, it was a symbol of equity in trade; on its delicate pivots were revealed the eternal principles of right, precision, and equipoise; qualities of character as well as necessities in trade. The final touch upon each machine has always been given by the sealer, who by affixing to it his name and number, is made responsible for the scale. Rarely has such a thing been known as the return of a [Fairbanks] scale; the durability as well as accuracy of material and work appears in the continuous use of the scales made in the earlier years.*



*E. & T. Fairbanks and Co's
Scale Manufacturing Co.
St. Johnsbury, Vermont.*

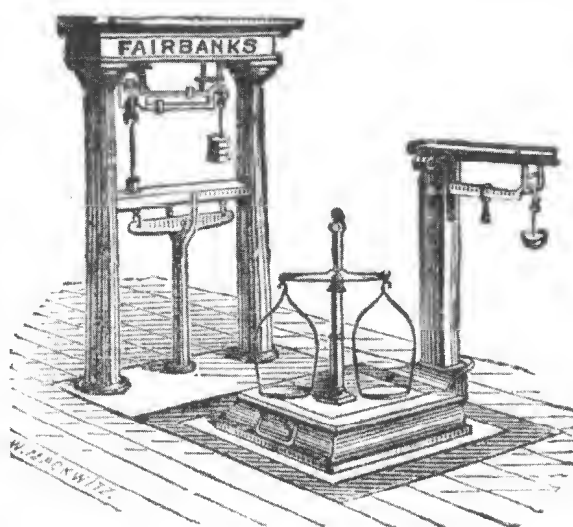
The Fairbanks Legacy

It all began with a practical need, really. Thaddeus Fairbanks needed to find a way to accurately weigh a wagon full of hemp straw.

His invention changed the world and ways of commerce around the world. The availability of accurate, easy-to-use scales meant that all types of goods could be valued, sold and traded fairly based on weight rather than volume or quantity.

Thaddeus believed that his design of the platform scale could be applied to weigh virtually anything. His often repeated proclamation, *Find me a place to stand and I could weigh the world*, [adapting Archimedes' quotation,] was not a boastful claim, rather an amplification of his belief in the universal application of his design.

Editor's Note: More articles relating to Fairbanks' 175th anniversary will appear in the next issue.



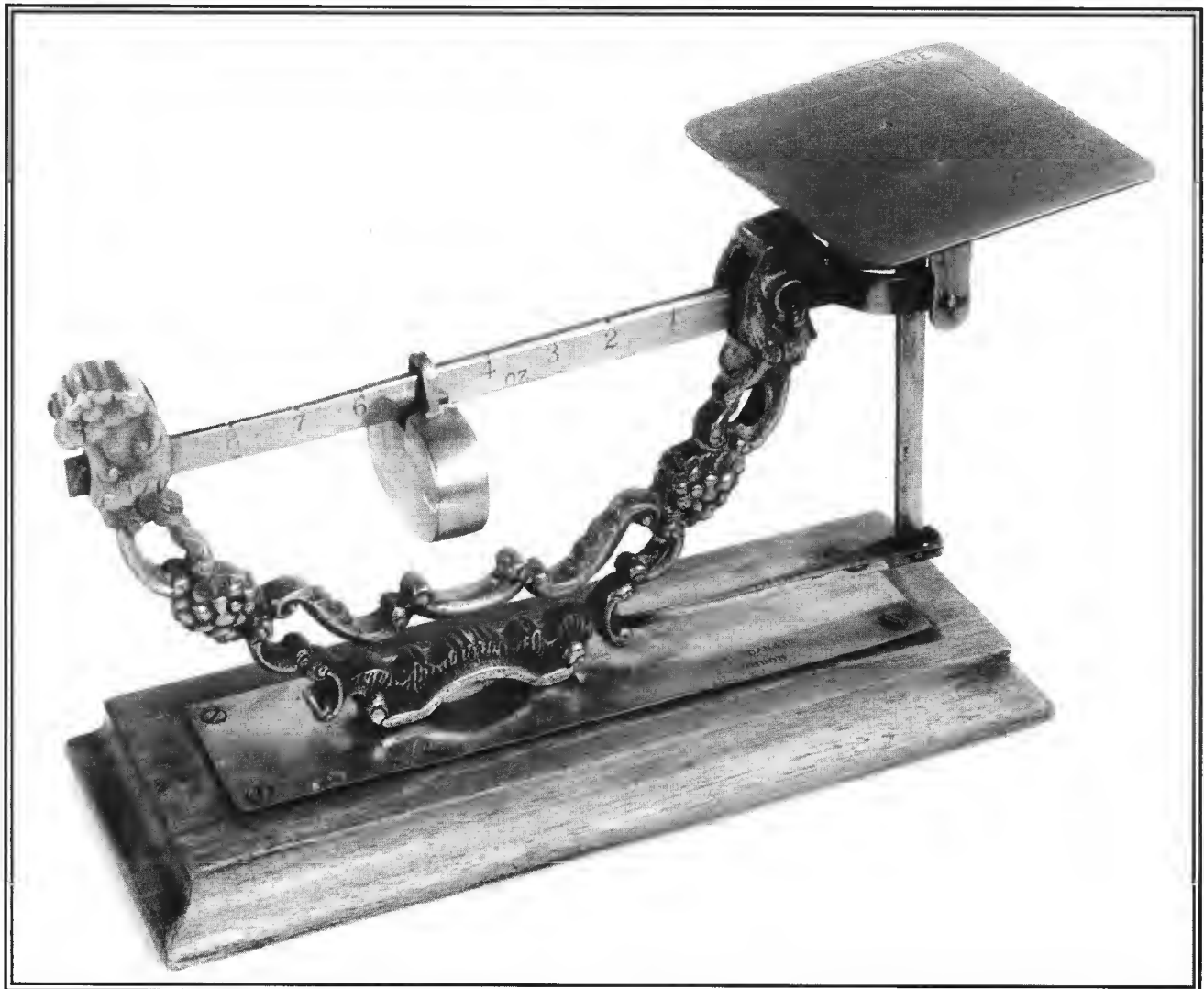


EQUILIBRIUM

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PAGES 3069- 3096



Cover Picture

This Sampson Mordan postal steelyard was once in the collection of Lou uit den Boogaard. Does it make you think of a J & E Ratcliff postal steelyard? Who designed the first one? Mordan or Ratcliff? There is no doubt that Ratcliff made far more money from his large production run than Mordan did from his small production of similar steelyards.

The beam is 210mm (8 1/4 inches) long, and the small brass base is mounted on a larger beech-wood base. The postal rates are for 1oz for 1d, up to 12oz for 4d, so it was made between 1871 and 1897.

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Fairbanks 175th Anniversary Celebration

BY STEVE BEARE

I recently spent the weekend of June 25 and 26 in Vermont to assist member Brooke Paige in his grand plan to celebrate the 175th anniversary of the invention of the platform scale in 1830. Brooke had been working on this project for over a year, and it had finally come down to the point of no return.

Brooke and I met at the Philadelphia airport at 7 am on Friday, flew into Manchester, NH, then drove for three hours and wound up at the remote Vermont Expo Fairgrounds in Tunbridge, VT around 2 P.M. to find that setup had not yet started. We then went to Brooke's remote log cabin home, after picking up a rented 24' truck, where a stressed-out carpenter was still working to finish and assemble two large restored Fairbanks dormant scales.

We began loading some of the numerous parts for the recreation of a 19th-century tent into a pickup truck and headed back to the Fairgrounds. Fortunately a volunteer, Fairbanks Field Technician, Larry Violette and I were there to help Brooke set up the period style tent/display Friday afternoon and we finally left at 7:30 P.M. Brooke and his wife Donna worked until 10:30 P.M. putting on the canvas roof panels, then returned home to start loading scales in the rented truck and worked until late into the night. Brooke had planned to return to the Fairgrounds with all the scales at 6 am on Saturday.

Saturday morning saw six eager volunteers including Larry Violette, Stu Hass, Pete Dayotas, Dave Farnham, Allen Yale and myself, waiting at the Fairgrounds at 8:00 A.M. The gates opened to the public at 10:00 A.M., but there was no sign of Brooke's truck until just before 10, as he had been loading all the scales, including the two huge dormant scales, by himself using a bucket on his John Deere tractor.

Brooke had asked us to wear white shirts and dark trousers to be in period attire. We all immediately stripped to our modern T-shirts and pitched in to unload and complete the booth setup, hanging shelves, pictures and scales, erecting wonderful copies of period signs, carefully unloading the



Figure 1. ▲▲ Setup Begins



Figure 2. ▲▲ The walls take shape.



Figure 3. ▲▲ Completed walls on TV.

huge dormant scales, as well as numerous other wonderful Fairbanks scales, many professionally restored, and finally finished installing everything by around 2 P.M.. The show closed at 5 P.M., and it took us an hour to put all the scales in the truck for safekeeping for the night.

Sunday setup took another hour in the morning, and there were no problems other than both days set a new local record for brutal temperatures, being in the high 90s with corresponding humidity. Needless to say, we all were dripping most of the time. Donna had made period vests for us all, including black bowler hats, but Brooke took pity and let us just suffer in our soaked white shirts and dark pants.

We began taking down the display at 5 P.M., and the three remaining volunteers along with Brooke finished putting the last scale in storage at Brooke's log cabin home at 10:30 P.M. I grabbed a sandwich, showered, rolled into the hotel bed at 11:30 P.M., and got up at 4 am to pick up Brooke at 5 A.M., and drove three hours to Manchester, New Hampshire to catch a plane to Philly while Brooke caught up on what was probably his first sleep in 2 days.

Despite all the work, it was a great weekend. Brooke's display was the hit of the Festival, and occupied three minutes of a five-minute segment of the Festival on the 11 P.M. Burlington, Vermont, TV news Saturday night.

The final picture (figure 9) is of Brooke on the dormant scale used to weigh visitors, who each got their own nicely printed official weight card with their name and weight

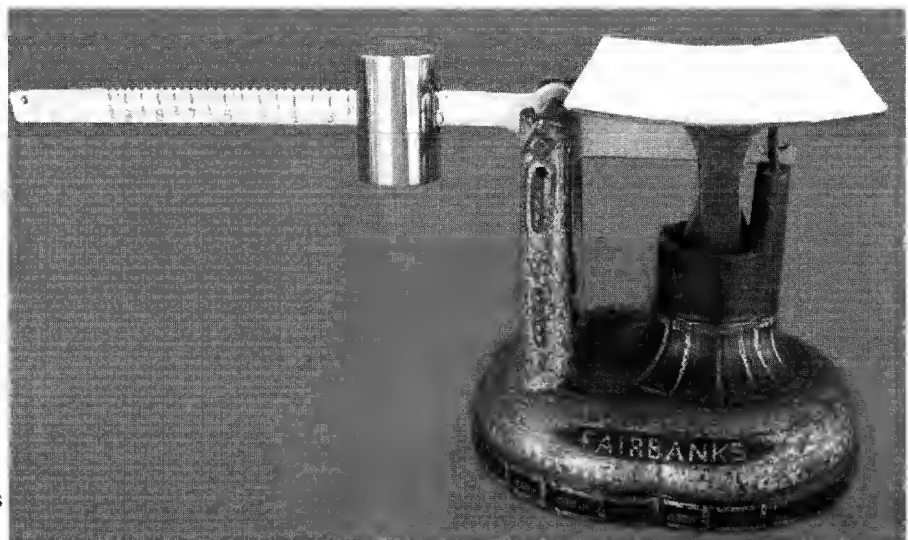
Figure 6. >> Rare Fairbanks Centennial postal scale.



Figure 4. ^^ The Fairbanks display completed.



Figure 5. ^^ Artist Mary Simpson with her original carved block and prints.



filled in. Brooke was just starting his talk on Sunday in the character of Thaddeus Fairbanks along with his wife Donna, portraying Lucy Fairbanks. The globe refers to Thaddeus's statement "Find me a place to stand and I could weigh the world". Brooke had dyed his hair Saturday night to be in character, and feverishly worked for a half hour to attach a beard, but the sweat pouring off his chin was too much for the gum arabic. The dormant scale in the background has the as yet unopened large Fairbanks scale time capsule referred to in the accompanying article.

Brooke designed every aspect of the display, and then hired a carpenter to make all the required pieces out of heavy rough-sawn lumber, which Donna stained for an authentic look. Additional details are heavy canvas for the roof, and custom forged iron fittings. Brooke had a number of wavy copper flags made, to attach to an inverted V wooden form to fit on the peak of the tent roof, with the word Fairbanks cut with a laser, and a large Fairbanks banner was draped on the roof.

He had numerous period-style signs professionally painted to embellish the look, and these proved to be a big draw. He also had reproduced and displayed a large number of rare prints and photos of Fairbanks factories and workers. These high quality offset sepia prints are on heavy buff paper and are available for purchase on the members only section of the isasc.org website.

Brooke had also commissioned a wonderful hand engraved lino-print (like a woodcut, but using a linoleum-like material), of the original Fairbanks wagon scale demonstration in 1830, and Vermont artist Mary Simpson was on hand Saturday to sign prints along with the original engraved block.

Brooke reassembled the display at the Fairbanks Museum in St. Johnsbury, VT on September 17 so current and former Fairbanks employees as well as the local community had an opportunity to see their important history re-enacted. It is truly amazing what one person with an intense interest can accomplish.

Figure 9. >> Brooke and Donna Paige in character.



Figure 7. ▲▲ Beautiful Fairbanks distillery scale.



Figure 8. ▲▲ Allen Yale weighing a volunteer.



Fairbanks Scale Time Capsule

BY DAVE FARNHAM & STEVE BEARE



Figure 1. ^^ Dave Farnham opening the crate, with Brooke & Donna Paige looking on.



Figure 2. ^^ The steel bands have been carefully removed.



Figure 3. ^^ The first board has been removed to reveal the excelsior packing.

During the 175th Anniversary commemoration of Fairbanks at Vermont Expo 2005, volunteer Dave Farnham displayed an unopened, crated scale that proved to be a virtual time capsule, dating to 1964.

A shipment of six Fairbanks scales had been sent to Guatemala in 1964, and was not paid for, probably because of political unrest at the time. The entire shipment was sent back to Fairbanks using an incorrect address, and eventually wound up in a warehouse at LaGuardia airport in New York.

During a 1979 Fairbanks service call at the airport, someone asked Dave to take back the scales, so he threw them into his pickup truck. Three of the crated scales were returned to Fairbanks, and eventually opened to reveal standard even balance scales. Shortly after that Dave left Fairbanks, and the three remaining unopened crates wound up at his home. Over the years, he had opened two of them, which contained the same even balance scales as the other three. He brought the last one to the Expo, and the unopened crate was displayed on one of Brooke Paige's Fairbanks dormant scales during the two day Festival.

Near the end of the Festival, Dave undid the metal bands, and carefully removed the two top boards while a large crowd gathered. To his surprise and delight, when he removed the large wads of excelsior packing, he uncovered a large inverted scoop around 28" long, and beneath it an inverted 25 pound capacity Model 922 scale with a poise, in new condition. All the iron weights are marked in LIB (short for the Spanish word for pound, libra), and weigh one, four, and eight libra. From the Colt Industries label and the accompanying instructions dated August 1964, the scale dates to 1964, the year Colt Industries took over Fairbanks Morse.

No one was more delighted than Dave to see that the last scale proved to be something special. After carefully balancing the scale with lead shot, the scale was carefully repacked in the box, and may be opened again at some future occasion, perhaps in 25 years on the 200th Fairbanks anniversary.

About the authors:

Dave Farnham worked for Fairbanks for many years, and then started his own scale company, Farnham's Scale Systems, in Williamstown, VT.

Steve Beare retired from DuPont in 2002 after 33 years. He is currently working on a directory of 19th century American scale makers.



Figure 4. << The large inverted pan is revealed.

Figure 5. >> The surprise 1964 scale is revealed.



Figure 6. >> A surprised and happy scale man.



Figure 7. << The scale label, Model 922, Colt Industries.

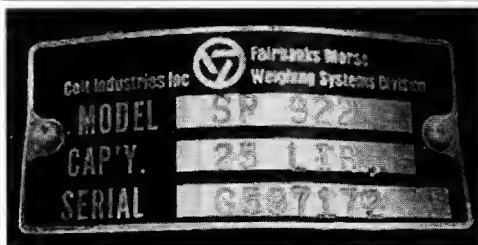
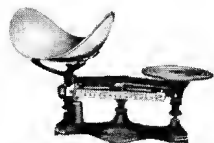


Figure 8. >> Scale parts list & instructions.

FAIRBANKS MORSE

PARTS LIST & INSTRUCTIONS



MODEL NO.	CATALOG NO.
705	46-5362
706	46-5358
707	46-5352
713	46-5363
714	46-5360
715	46-5353
813	46-5061
814	46-5057
815	46-5051
817	46-5161
818	46-5157
819	46-5151
922	46-5365
924	46-5366
925	46-5064
926	46-5164

EVEN - BALANCE SCALES

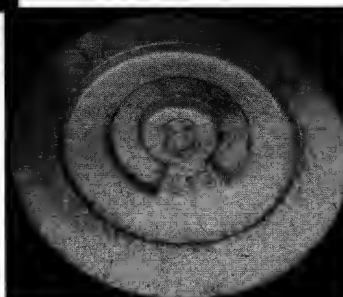


Figure 9. << The 8 LIB weight.

Figure 10. >> Brooke and Dave adjusting the lead shot.



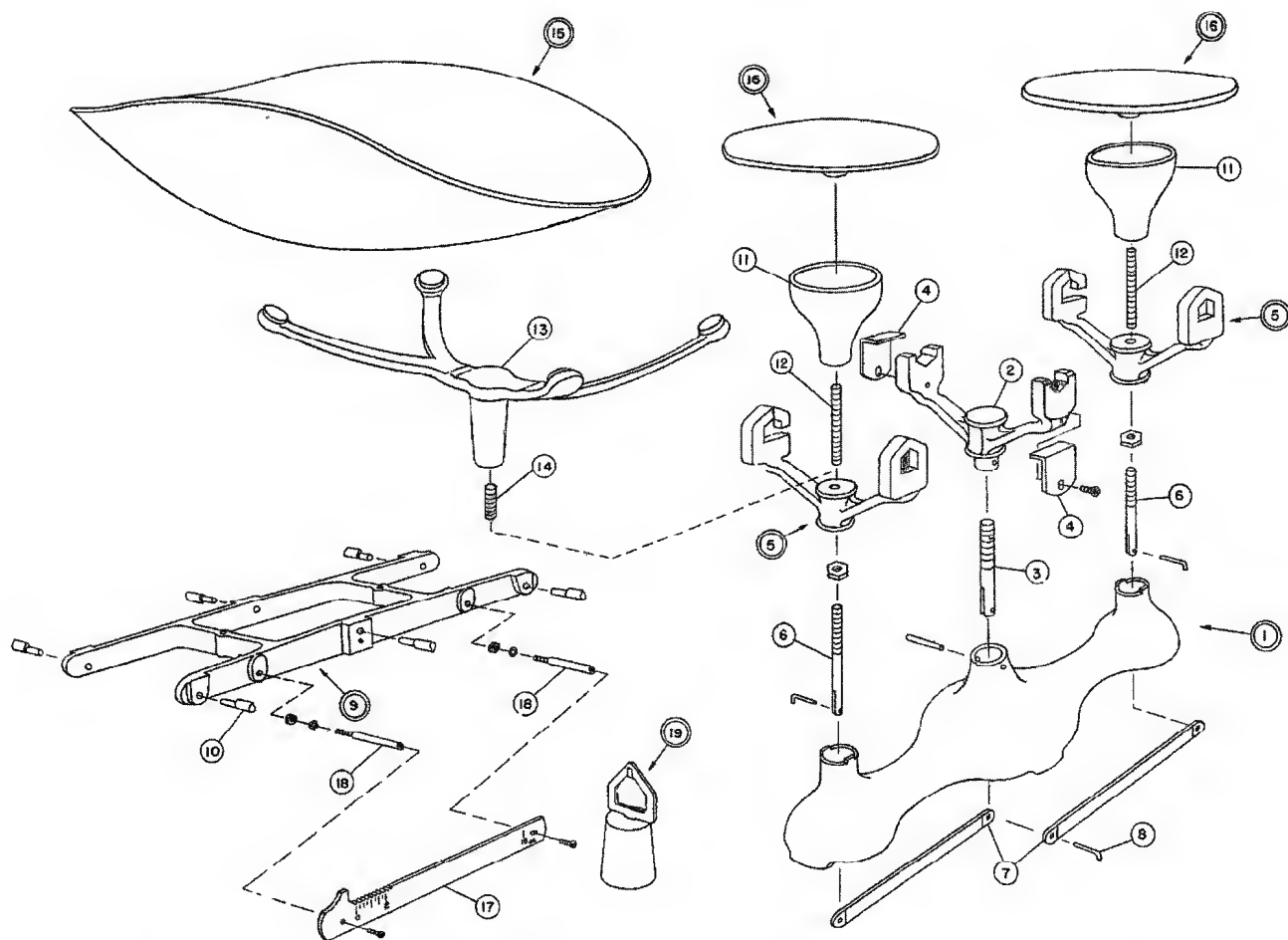


Figure 11. ▲▲ Scale schematic for Fairbanks model 922.

Letter to the Editor 1 from D F Crawforth-Hitchins:

I know that Americans are very proud of Fairbank's claim to have invented the platform scale, but EQM should include a caveat every time such a claim is made. Even Fairbanks' manager reported that he had seen a platform scale in use in Boston before Thaddeus Fairbanks attempted his first design. We do not know who designed that platform scale in Boston, but it is quite feasible that it was brought from England, where platform scales had been in use for nearly 100 years.

Read the articles by Michael Crawforth, EQM pages 655-661, 692-699 and 721-727. These draw together much published material on early platform scales, and put Fairbank's contributions into context. Fairbank's platform scales were hugely successful in Britain because of the manufacturing method used, that allowed quick repair and adjustment, and were produced by Pooley over a long period.

So please state that "Fairbanks made claims to have invented the platform scale".

Letter to the Editor 2 from D F Crawforth-Hitchins:

Michael Robinson brought up the idea on EQM page 3023, that possibly F Mordan might have made the unconventional weights he had seen. "F MORDAN'S REG INK FLASK" certainly comes into the same field of merchandise as S Mordan's products.

Francis Mordan, born in 1817, proves to have been third child of Sampson Mordan (I). He was a clerk in his father's company, and living at 22 Castle St, London, Sampson Mordan's factory and home, and even after he started his own company, continued to live there with his parents and his brother Augustus. He started a company in the 1830s, independently of his father's company, that made pens and pencils only, and made a big improvement in pens with an everlasting, iridium-pointed gold pen in 1892.

By the 1930s both S Mordan & Co and Francis Mordan & Co had been supplying pens and pencils for over one hundred years, and any old "Mordan", (the colloquial term for a gold pen,) could be exchanged for a new pen as long as the old pen was not broken.

There is no evidence that Francis Mordan made anything other than pens and pencils.

Supplementary Notes on Paper Scales

BY DAVEN CHAMBERLAIN

In an earlier article in this journal the subject of Paper Scales was discussed in some depth.¹ During research in support of an article on paper testing equipment,² the current author unearthed some further information, and additional designs, extra to those in the original article on scales. This new information is presented below, along with illustrations, where appropriate, of the different designs.

Background

The measurement of Basis Weight (weight per unit area) is one of the most basic tests performed on all papers. It gives a "fingerprint" of a paper, in that it produces a measure of the amount of material (mainly fibre and inorganic pigment) present, which is of importance because so many other properties, such as strength, opacity and stiffness are related to this value. It also forms the basis by which most products are sold, with the exception of some boards and cards, which are sold by caliper [thickness].

The universality of the test gave rise to a multitude of different scale designs for the paper-using market, as was shown in the aforementioned article in *Equilibrium*. The most well known are probably quadrant, or pendulum, scales. The basic design had between 1 to 3 scales [or sets of graduations] shown on the sector; these all referred to the ream weight of a set sheet size (such as Demy or Royal), and differed only in the number of sheets per ream.

The Universal Paper Scale

This pattern of scale was improved upon by Sindall, an eminent English paper scientist, who produced the Universal Paper Scale which was capable of registering ream weights for a variety of finished sheet sizes. The adaptation, (shown in Figure 1)³, consisted of a weighted poise (P) attached to the index arm. The poise was moved relative to a vertical scale [graduation] calibrated to sheet sizes. Additionally, when the poise was positioned at the Demy marking, the index arm registered the weight in metric units (g/m^2).

The sector shown still had three scales [sets of graduations]: the innermost was for metric basis weight ("grammage"); the

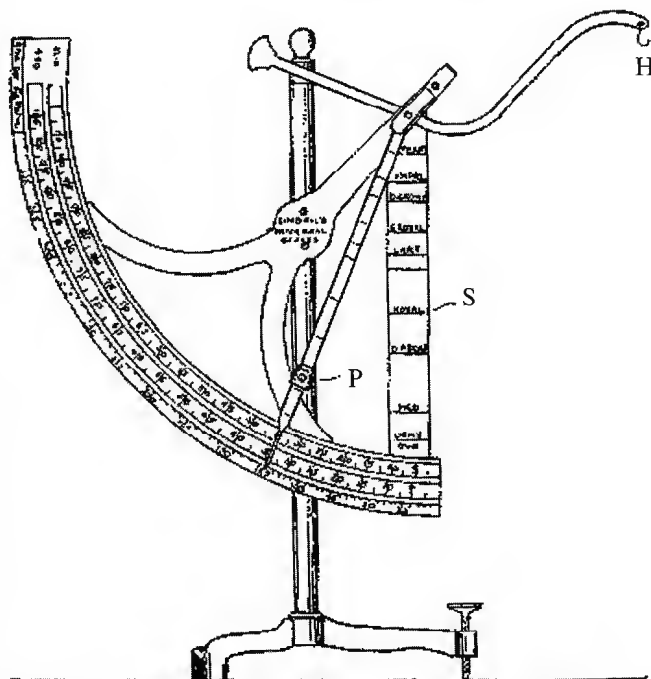


Figure 1. ▲▲ Sindall's Universal Paper Scale, dating from 1912.



Figure 2. ▲▲ Thwing Albert's Basis Weight Scale.

middle was in imperial units for a ream of 480 sheets; the outer scale was [graduations were] in "milligrams per 6g metric", suggesting the apparatus could also be used as an analytical balance. Indeed, this was another claim of Sindall's; since the template used for cutting produced a sheet of 1 square decimetre, when the poise was so positioned to register the metric basis weight, division of this value by 100 gave the actual weight of the test piece. (eg. For a sheet of basis weight 131.5g/m^2 , the actual test square was 0.1315g in weight.) This meant that if the sheet was to be used for further tests, such as ashing, no supplementary weighing was needed.

Another advantage claimed for the scales was their ease of calibration; since the scale was calibrated in metric units, hanging of gram weights on the suspension point (H on the illustration) gave a direct reading on the scale.

These scales were manufactured and sold by the partnership of Messrs. Sindall and Bacon.⁴

Before leaving the subject of quadrant scales, it has previously been suggested they were developed by a German paper merchant working in London, named Leunig.⁵ Since the earliest Leunig scales I have found date from 1894, the veracity of this suggestion is undermined by scales shown in the aforementioned *Equilibrium* article, which pre-date those of Leunig by around six years.

Thwing Albert and Amthor

Scales of a very different design were produced by the Thwing Albert Company (see Figures 2 and 3); they were of an equal-arm design, dating from the early 1920s, and were designed to be wall-mounted. Two variants are shown; that in Figure 2 gave basis weight for a single sheet, whilst that in Figure 3 was a differential scale, whereby two sheets were hung, one per arm, and the central pointer registered the difference in basis weight. These apparatus were still manufactured by Thwing Albert until very recently.⁶

Thwing Albert made a further scale that they termed a "moisture scale" or "humidometer" (see Figure 4). It seems as though a "standard" sheet of known weight was hung from one arm, and a counterweight

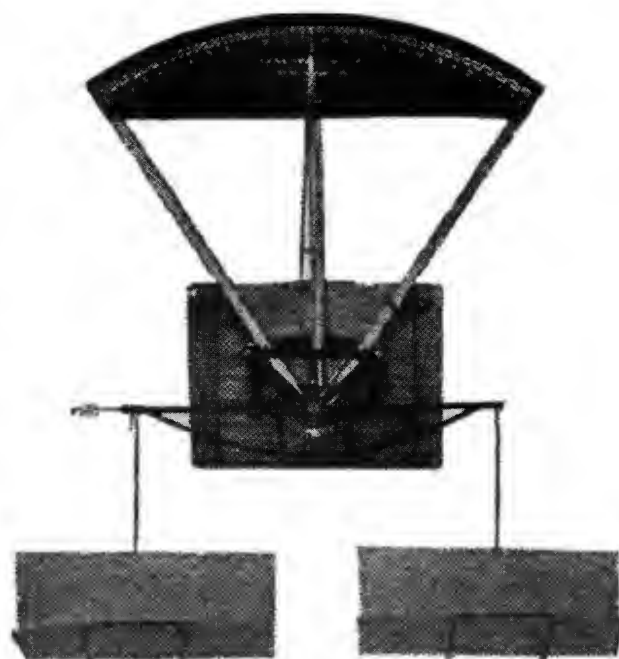


Figure 3. ▲▲ Thwing Albert's Differential Basis Weight Scale.

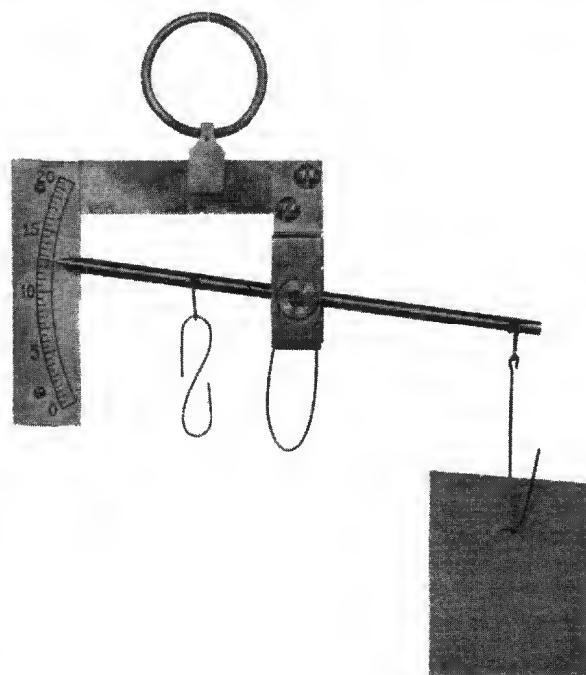


Figure 4. ▲▲ Thwing Albert's "Humidometer", for estimating moisture content of paper, dating from 1921.

was moved along the other such that it balanced to give a "0" value on the left hand scale [graduations] for the bone-dry sheet. The central beam acted as an indicator against this scale, which was calibrated in "moisture units". It must be assumed that the "standard" paper was supplied with the apparatus otherwise it would not be possible for the scale to have been correct. Furthermore, it seems likely that this was not a popular apparatus, as it is not shown in the myriad of adverts placed by Thwing Albert in the TAPPI Journal of the late 1920s and early 1930s. (This is not surprising since the basis upon which the use of the instrument lay; that the moisture content of the paper "standard" would indicate the moisture content of any sheets allowed to condition in the atmosphere in which the scale resided, is wholly inaccurate.)

The other new design found was that made by the Amthor Testing Instrument Co. Inc., and was called the Paper Computing Scale (see Figure 5). The advert shows it to have been encased, so as to prevent complications caused by draughts. Again it appears to have been of an equal-arm design, and judging from claims in the advert, was similar in concept to the Thwing Albert Differential Weight instrument.

Conclusion

In most modern mills the principle of measurement is similar to that described above, whereby a sample of paper is cut to size and weighed; the only exception is that digital pan scales have generally taken the place of pivoting arms. Such scales are not unique to the paper industry, and can be found in all manner of laboratories. However, quadrant scales are still quite common, mainly with merchants, probably because they are cheap and easy to operate. They are made by a large number of manufacturers, whereas the majority of other scale designs shown in this and the previous article in *Equilibrium* are no longer made or in common use.

Notes and References:

1. Crawforth-Hitchins, D.F., "Paper Scales", *Equilibrium*, 1993, No.3, pp.1695-1905.
2. Chamberlain, D.C., "History of Paper Test Instrumentation Part 1: Introduction and Basic Material Composition", *The Quarterly* (The Journal of the British Association of Paper Historians), No.53, January 2005, pp.6-15.
3. News Item, "A New Paper Scales", *The World's Paper Trade Review*, Vol. 57, 1912, pp.1302-1303.
4. See advert in *The World's Paper Trade Review*, Vol.72, 1919, p.431.
5. Willets, W.R. & Marchetti, R.F., "Some Historical Developments in Paper Testing", Symposium on Paper and Paper Products, 65th Annual Meeting of the American Society for Testing Materials, *ASTM Special Technical Publication No. 241*, pp.3-13.
6. The scales could still be found in their catalogue from 1995, but are not shown on the website of 2005.

PAPER COMPUTING SCALE

SAVES TIME - MINIMIZES POSSIBLE ERRORS



DIRECT READING
in

- Percent Deviation
- Actual Ream Weight
- Average Ream Weight of Several Samples

(Send For Descriptive Literature)

ALSO

PAPER AND BOARD SCALES
MICROMETERS (Pocket and Desk Type)
TENSILE STRENGTH TESTERS
BURSTING STRENGTH TESTERS
FOLDING ENDURANCE TESTERS

OPERATION RECORDERS
HAND AND STATIONERY TACHOMETERS
DEAD WEIGHT GAUGE TESTERS

AMTHOR TESTING INSTRUMENT CO., INC.
8 LEO PLACE BROOKLYN, N. Y.

Figure 5. ▲▲ Amthor's Paper Computing Scale, from an advert of 1936.

Author's Biography:

Daven Chamberlain studied Chemistry at Bath University in England, before undertaking research in the field of Paper Conservation at UMIST, Manchester, for his PhD. Since graduating in 1991 Daven has worked for Arjo Wiggins, the world's largest manufacturer of fine papers, at their English R&D site at Beaconsfield near London. He is currently Section Leader in charge of Paper Testing and Printing. In addition to various posts held with different technical associations, Daven is Editor of The Journal of the British Association of Paper Historians, called The Quarterly, and he can be contacted via the Association's website: www.baph.org.uk.

More Mordan Weights 1

BY MICHAEL ROBINSON

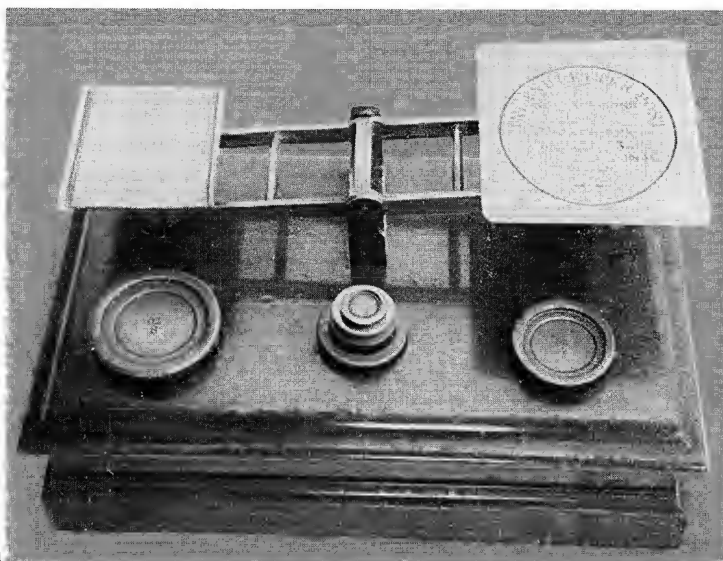
I quite agree that the box-base Mordan in *Equilibrium* No.3 of 2005 (Fig. 18) is an uncommon scale.

I have been able to handle half a dozen of these over the years and they have always been fitted with normal Mordan stack weights.

The brass knobbed cylinder weights shown in Fig. 18 and 19 are very rarely encountered.

The 'partners' scale is stunning, but I note that neither user is afforded a view of the A frame.

Fig. 1. >> Scales with box-bases, like the rare Mordan shown here, usually have normal stack weights like these.



More Mordan Weights 2

BY ALBERT RANGELEY



I was pleased to read the article on the 'Partners' Scale' in *Equilibrium* No.3 of 2005 and that it is considered to be a 'rara avis'.

However, I have owned the identical scale for several years without it attracting more than a passing interest from visiting members of ISASC Europe. Perhaps it may now arouse more passion after it has become the frontispiece of an edition of EQM.

My weights are as Fig. 4 in the article by Andrew Crawforth, having concentric circles in addition to the normal pattern, but the second set is in Tolas from 8 to $\frac{1}{4}$, again with concentric circles.

Orlando W. Bedell and the Zenith Egg Grading Scale, Part 2

BY CHARLEY AMSBAUGH

As described in the last issue of EQM, I visited Earlville in September 2004 and enjoyed an exhilarating experience tracing the origin and early years of the Zenith Egg Grading Scale. Several months after that, I bought a Zenith Egg Grader with a dark gray painted cast iron base and instructions in its original box. The instruction sheet indicated that the grader was *manufactured by N.L. Pratt, R.D. #3, Lowville, N.Y.* I thought at the time that the Grange League Federation (G.L.F.), which had bought the Zenith Egg Scale business from Orlando W. Bedell in 1948, must have sold it to Pratt, presumably about 1960. I thought the story I had developed was pretty solid up to that point, but knew that a future trip to Lowville would be in order.

So, in late July 2005, while the previous issue of EQM was at the publishers, my wife and I again found ourselves in Central New York for this year's visit to her home turf. The first break in our visiting schedule found my brother-in-law, (who has a Zenith Egg Scale passed down from his grandfather), and I heading for Lowville, about 90 miles northeast of Syracuse.

Visits to the Lowville Village Clerk's office, the town historian, and the Lowville office of the Lewis County Historical Society failed to turn up any leads. The first break in the case that day came in the County Clerk's office, where the index of land records revealed a deed transferring title for a parcel of land from Pratt's Farm Inc. to Norval L. Pratt and his wife, Sara R. Pratt. The land in question was in the neighboring town (township) of New Bremen and was along R.D. #3 from the Lowville Post Office. So, I got a copy of the deed, and off we went.

Before leaving Lowville, we stopped at the Lowville Town Clerk's office, just on the chance they might have some information on the Pratts. The Town Clerk didn't have any official information that would help, but she took a few minutes to suggest various places I might look. One of the places she suggested we stop at when we got to New Bremen was Dave Becker's Barber Shop. After all, she reasoned, the barbers in small villages like New Bremen usually know everyone in that village and the surrounding area. As it turned out, Dave didn't remember the Pratts, nor did the man whose haircut I interrupted when I walked into the barber shop carrying a Zenith Egg Scale which Pratt himself had made. As I started to leave, however, an older lady named Doris Harris, who was waiting for her husband to get his hair cut, showed an interest in the egg scale I was carrying, so I sat down and visited with her for a few minutes. After awhile, she suggested I talk to her brother, Norm Schultz. She thought he knew just about everyone in that area, and there was a good chance he might remember the Pratts, so she gave me directions to his house. What good fortune that turned out to be.

When I arrived at Norm's house and explained my quest, he invited me in and started working the phones with people he thought might have some knowledge of the Pratts, but to no avail. As he read through the deed I mentioned earlier, Norm recognized the land description and called Gilbert Widrick to confirm the location. Gilbert used to live on the farm across the road from the Pratt farm. He remembered that Norval Pratt sharpened clippers for people in that area. He thought he remembered an egg scale business on the Pratt farm, but he couldn't be sure. He did confirm that Norval and Sara Pratt later sold that farm to Clint and Nancy Walzman, so Norm gave me directions to the Walzman farm.

When we visited the Walzman farm, Nancy remembered that Pratt had shown her and Clint his egg scale operation when she and Clint first looked at the farm when they were considering buying the place. When asked what ever happened to the Pratts, Nancy said that Norval had died several years earlier, but that Sara was still alive. Nancy remembered that the Pratts had come from New Woodstock, NY, originally, and that they had returned there when they left Lowville in 1979. In fact, she thought the Pratt children still lived in the New Woodstock area, southeast of Syracuse and about 85 miles south of Lowville. By this time, it was getting late, so my visit to New Woodstock would have to wait.

Two days later, another break in our family visiting schedule facilitated my trip to New Woodstock. I stopped at Kay's Country Store in Erieville on the way to inquire about the Pratts. Kay knew the Pratts and confirmed that Norval Pratt (Bud) had died a few years earlier. Bud's widow, Sara, and their son, Norval Jr. (Chip), were still living in the New Woodstock area. Kay looked up Chip's address and phone number, and gave me directions to Chip's farm west of New Woodstock. When I arrived at the farm, I met Chip's daughter, Andrea, and learned that Chip and his wife were away on business. Andrea confirmed that her grandfather used to make Zenith Egg Scales just like the one I was carrying. In fact, her father used to help her grandfather make them. She said her grandma, Sara Pratt, was the one I really needed to talk to. Sara could tell me more about Bud Pratt and his Zenith Egg Scale operation than anyone else could, so Andrea gave me directions to her grandma's house.

Since I couldn't meet Norval L. (Bud) Pratt himself, can you imagine what a thrill it was for me to be able to meet the woman who had stood beside him while he made those countless thousands of Zenith Egg Scales? I was about to get "the rest of the story" from the widow of the man who made the Zenith Egg Scale during what I thought was the final chapter in that scale's life history. You can imagine my surprise when Sara Pratt told me that her husband had made the Zenith Egg Scale all the way from the early 1950s until the mid-1980s. He made Zenith Egg Scales in Earlville as an employee of the Grange from about 1950 until 1964. When Agway was formed through the merger of the Grange and two other farmers' cooperatives in 1964, Agway moved its farm store from Earlville to Cortland. Pratt continued making Zenith Egg Scales, which by then were called Zenith Egg Graders, for Agway until the early 1970s. By then, the demand for single mechanical egg scales had declined sufficiently that the Zenith Egg Grader was no longer the big money-maker it had been, so Agway shut the egg scale business down. Pratt took over the Zenith manufacturing business at that point and set the equipment up in his basement in New Woodstock. When they moved to New Bremen, near Lowville, in 1974, Pratt took all that equipment along and continued making Zenith Egg Graders there, shipping them with instruction sheets indicating that the grader was *manufactured by N.L. Pratt, R.D. #3, Lowville, N.Y.* When they returned to New Woodstock in 1979, Sara said her husband set up the Zenith manufacturing equipment in the garage and continued making Zenith Egg Graders. In fact, Pratt was still making the Zenith in his garage in New Woodstock until the mid-1980s, when he sold the business to Tim Coon, just down the road in the neighboring town (township) of DeRuyter. Before I finished my visit with Sara, she showed me the only "Pratt" egg scale she still had – a beautiful Zenith Pedigree, which some people refer to as a "Hanging Zenith" – sitting proudly on a shelf. I then opened the box of Zenith Egg Scales I had brought along and showed her the blue-based Bedell model, the two Grange models, the Agway model, and the two models her husband made after he acquired the business. Her pride was obvious as she wiped away the tears so she could clearly see the line-up of various Zenith models her husband had made in all those places in the 35 years on his watch. By then, it was time to go, so she gave me directions to Tim Coon's farm in DeRuyter.

On the way towards DeRuyter, I naturally assumed that demand for the Zenith had continued to decline over the years as automation took over, and that production of the Zenith had undoubtedly ended with the man I was about to meet. I acknowledged the possibility that the Zenith business might have been sold again, but I could sense that I was getting close to the end of the trail I had begun following some 10 months earlier. Assuming that production had ceased altogether, I thought the best I could hope for was that some of the patterns might still be around, and perhaps I could buy one to complement the 20 Zeniths in my egg scale collection.

You can imagine my surprise when I finally met Tim Coon and learned that he is still making the Zenith Egg Grader. I had stopped at a farm on the way to DeRuyter to get directions to Tim's farm. As it turned out, that was his brother's farm, and Tim happened to be there at the time. When I asked him if he recognized the Zenith Egg Grader I was holding in my hand, Tim said, *I sure do. I make them.* I took out the box of Zeniths I had with me and showed him some of the scales made by his predecessors during various stages of the Zenith's life history, as it moved some 43 miles from Earlville to Cortland, 30 miles to New Woodstock, then 85 miles to Lowville, 85 miles back to New Woodstock, and 7½ miles to Tim Coon's farm near DeRuyter, to wind up some 75 years later just 23.2 miles from where it started its life in Earlville. Tim was as amazed by all the Zenith history I shared with him that day as I was to learn that someone was still making the Zenith. He confirmed that he had bought the Zenith Egg Scale business from Pratt in 1987 and had been making the Zenith on his farm in the town of DeRuyter ever since, making the Zenith one of the last American egg scales still in production in 2005, if not the very last one.

Corrections

The first part of this article, which was published in the previous issue of EQM, ended with a dissertation on the various labels observed on Zenith Egg Scales/Graders over the years. Of the seven labels discussed, the last two were presented in reverse sequence. I found out from Tim Coon that what I described as the *Zenith Egg Grader label upside down on a dark gray painted base (Figure 7)* is in fact the one still being used, so should have been presented as the last one in the series, i.e. Figure 8. Consequently, the *Zenith Egg*

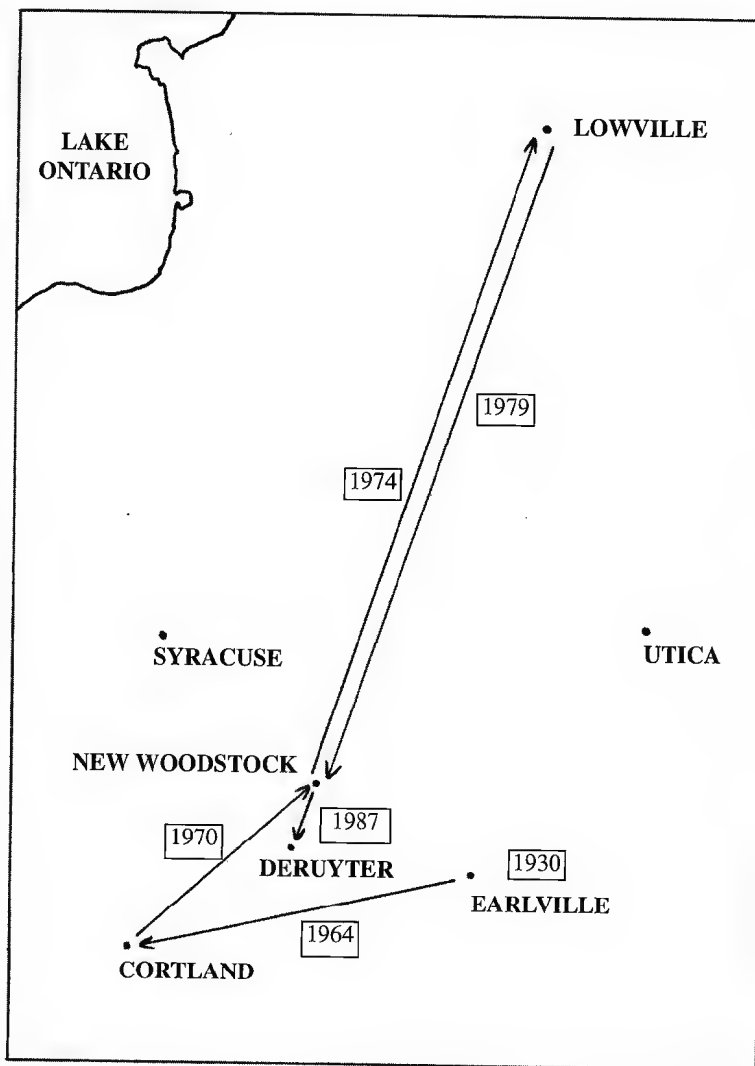


Figure 1 ▲▲ New York map showing the locations and dates for the production of Zenith egg scales from 1930 to the present.

Grader with the label right side up on a dark gray painted cast iron base (Figure 8) was the next to the last label, so should have been reflected as Figure 7. All seven labels will be presented below with the correct figure numbers to facilitate further discussion.

As a result of this new-found information, part one of this article should have ended as follows: *Although ownership had passed from Bedell to the Grange, the Zenith continued to be manufactured in its hometown, so 'EARLVILLE, N.Y.' was retained and 'U.S.A.' was added to the label. When production moved from Earlville to Cortland, Earlville no longer applied, so Agway had the words 'EARLVILLE, N.Y., U.S.A.' removed, leaving 'ZENITH EGG GRADER' (Figure 7). Agway kept light blue as the color for the base. When Pratt acquired the scale, he kept the label, but changed the color of the base to a dark gray. The master molds were later destroyed in a fire at the foundry where the cast iron bases and counterweights were made, so Pratt had new master patterns made, resulting in the upside down 'ZENITH EGG GRADER' label with each word on a separate line (Figure 8).*

Seven Zenith Egg Scale Labels, corrected from Part 1

<p>ZENITH Egg Grading Scale Pat. Applied For MANUFACTURED BY O. W. BEDELL EARLVILLE, N.Y. (paper label)</p>	<p>ZENITH Egg Grading Scale MANUFACTURED BY O. W. BEDELL EARLVILLE, N.Y. (paper label)</p>	<p>ZENITH EGG GRADING SCALE MFG. BY O.W. BEDELL EARLVILLE, N.Y. (blue cast iron base)</p>
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Figure 2

Figure 3

Figure 4

<p>ZENITH EGG GRADING SCALE EARLVILLE, N.Y. (blue base)</p>	<p>ZENITH EGG GRADER EARLVILLE N.Y. U.S.A. (blue base)</p>
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Figure 5

Figure 6

<p>ZENITH EGG GRADER (light blue or dark gray base)</p>	<p>GRADER EGG ZENITH (gray base)</p>
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Figure 7

Figure 8

Editor's note: Part 3 of this article will appear in the next issue of EQM.

The Proceedings of the Old Bailey London 1674 to 1834

BY RICHARD HERBERT

During some research on the history of the Herbert Group, I came across a relatively new website, www.oldbaileyonline.org, which I believe will be of interest to other ISASC members.

This is a fully searchable online edition of a vast body of texts containing accounts of 100,621 criminal trials held at London's central criminal court from April 1674 to October 1834.

The crimes tried were mostly felonies (predominantly theft), but also include some of the most serious misdemeanours. The first published collection of trials dates from 1674, and from 1678 accounts of the trials at each session (meeting of the Court) were regularly published. Inexpensive, and targeted initially at a popular rather than a legal audience, the Proceedings were produced shortly after the conclusion of each sessions and were a commercial success. With few exceptions, this periodical was regularly published each time the sessions met (eight times a year) for 160 years. In 1834 it changed its name, but publication continued until 1913. Funding is currently being sought to put these later editions online.

The Proceedings are searchable by keyword and occupation, and I have searched both using "scale-beam maker", "scalemaker", "scale-maker" and "weighing machine", + their plurals. The word 'scale' results in far too many hits.

Nearly all the cases involving scalemakers were theft – either burglary or larceny - although there was one trial for the murder of scalemaker John Thatcher - which resulted in a 'not guilty' verdict - and one forgery. Despite the [relatively mild] nature of the crimes, three of the defendants were sentenced to death, and many others transported variously for seven years, fourteen years, or life.

Most of the scalemakers were either witnesses to the alleged crime or character witnesses for the defendant, only two cases involving the trial of scalemakers, those of Thomas Pixley I and Thomas Heard.

In relation to the Herbert scale trade history, we trace our origin to the business founded by John Wood, trading from 1734 to 1765.

The first mention of a Wood was Richard, trading from 1768 to 1820, when a John Harris was tried for *burglariously breaking and entering the dwelling house of Henry William Dinsdall - on 28 October 1795 - about the hour of ten in the night of the 6th of October, and stealing therein, a gold watch, value 10 l. a cornelian seal set in gold, value 10 s. a steel watch chain, value 8 d. a gold watch key, value 2 s. a gold bed hook, value 2 s. one hundred and twenty-five pounds weight of sewing thread, value 80 l and twenty-five pounds weight of sewing cotton, value 20 l.*

Wood traded from No 15 Queen Street, Cheapside, and Dinsdall had employed two hairdressers to sleep in his premises at night. Wood's evidence stated *On the 6th of October, Tuesday evening, it may be some little before ten o'clock in the evening, I had just done supper, I thought I heard rather more noise than usual. I opened my door, and found a man of the name of North had a man in possession by the collar, and I was given to understand that he had made his escape out of the next house to mine.*

The really interesting aspect of these trial reportings is the detail, which brings the characters and

times so much to life, much more so than entries in a register of births, marriages or deaths. Did you know that Queen-street was *a wide street, just room for two carts to pass*? What was a gold bed hook used for? Was the culprit fortifying himself before the burglary, as *he called for six penny's worth of gin and water* at 'the Fleece, in Well-court'? One witness was 'at the Three Cranes.....*I heard call stop thief. I am patrol and constable, but I was not on duty. I was drinking a pint of beer. I left my beer on the table, and ran out of the public house.*

Through a pickpocketing case in August 1831, I discovered that scalemaker William Clemson was brother-in-law to Robert Wood, Richard's son[?]. The victim, Benjamin Lambeth, stated *I was not sober, and laid down in Smithfield, opposite the Ram Inn, in one of the sheep-pens. I awoke about five o'clock, and my hat was gone from my head, my money from my breeches pocket and my stockings and shirt also, my shoes were taken off my feet.*

The two thieves, aged 21 and 17, were found guilty on Clemson and Wood's evidence, and transported for life. Nowadays it would probably be a community service order, or more likely a caution!

An interesting piece of history comes to light in a trial on 15 Jan 1778, where William Astell [Astill] a scale-maker in King's-Head Court, Beach-Lane gives evidence, followed by John Partridge who 'took an apartment of Mr. Astell ', moving 'my goods in on Christmas-day'. Partridge later became a partner with Astell [Susannah Astill, widow of William] from 1790 – 1794, before starting on his own account.

The testimony of William Astell, scale-maker to his Majesty, was also crucial in the acquittal on 11 May 1785 of Elizabeth Ford, indicted for stealing twenty-three pounds weight of brass chain for scale-makers, value 50 s. the property of William Wood.

The name Thomas Pixley appears twice in the records, and Diana Crawford-Hitchins shows two Thomas Pixleys as scalemakers, 1741-1808 and 1762-1793.

On 12 Jul 1775, despite having another scalemaker Solomon Blackman as a character witness, to say *I have known Pixley this twenty-four or twenty-five years, I never knew any thing particular of him, but as an honest man*, he was found guilty of theft and sentenced to transportation.

However in 1776 transportation was halted by the outbreak of war with America. Although convicts continued to be sentenced to transportation, male convicts were confined to hard labour in hulks on the Thames, while women were imprisoned. Transportation resumed in 1787 with a new destination: Australia, seen as a more serious punishment than imprisonment, since it involved exile to a distant land.

The trading dates for the Pixleys would tend to the conclusion that he escaped transportation and was released from a prison hulk to work again, or was there a third one?

On 14 Sep 1791 Thomas Pixley gave evidence at the trial of Sarah Jessop, and stated *I am a scale-beam-maker, Monkwell-street; I have know the prisoner above three quarters of a year, a very hard-working young woman. She polishes Japan waiters.*

The individual cases often cover many pages each, so I have only tried to give a flavour of them here – I really recommend an evening or two online at www.oldbaileyonline.org !

PROCEEDINGS OF THE OLD BAILEY

Date	Defendant(s)	Offence charged	Scalemaker(s) involved	Extract from Evidence relating to Scalemaking	Verdict	Sentence
05 Apr 1832	James Caple	Theft: simple grand larceny Stealing 1 weighing-machine (value £1.15s), the goods of Thomas Burchfield	Thomas Burchfield	I am a weighing-machine maker, and live in Smithfield. On 26th March, about five o'clock in the morning, our inspector called me up - he had the prisoner at the watch-house, he had been on and off in my employ for two years, and was so five weeks before. I saw this machine at Guildhall, and recollect I had seen it safe in the yard, near my house, on Sunday night, there was a quantity of them under tarpaulin - it was not locked up, anybody could come into the court. I saw the prisoner on my premises a week before, and told him to go away.	Guilty, aged 33	Confined three months
14 Jul 1756	John Rawlins	Theft: simple grand larceny. Stealing 12d halfpenny in money, the money of Tipping Rustate	John Goodman	TR: I am a grocer, and the prisoner was my serv-ant. Having missed halfpence out of my desk several times, on the 14th June last I took five shillings in halfpence to a scalemaker's, to be marked. JG: I marked these halfpence at the request of the prosecutor with a dot in the letter G, and a scratch in the Britannia betwixt the arm and the body.	Guilty	Transportation
13 Sep 1758	John Fish	Theft: specified place Stealing one iron scale-beam (value £3)	Robert Caple	I am a scale-beam maker. The prisoner came to my house, and told me he had a scale-beam to dispose of.	Acquitted	
17 Jan 1759	John Smith Joseph Blaze Henry Feathers	1. Theft: simple grand larceny. 2. Theft: receiving stolen goods. JS & JB indicted for stealing 37lb sugar (value 24s), the property of Robert Robinson. HF for receiving same, well knowing it to have been stolen.	Mr. Cattle	Q: What are you? A: I am a scale-maker. I have known Blaze 8 or 9 years, he is a very sober lad, he worked along with me, I never heard the least blemish of him in my life.	Both guilty	Transportation
09 Dec 1767	James Phillips	Theft: simple grand larceny. Stealing two half hundred weights (value 12s), the property of Charles Hammerton.	William Lamb	CH: I am a paviour. In the night between 11th and 12th October I had ten half hundred weights sto-len, with other things from Moorfields, where we were weighing stones, going to Sir John Fielding's, I called at Mr. Lamb's a scale-beam-maker in Long Lane, to desire he would stop the party that brought such; he said he had just bought two weights; I saw them, they are new weights, and I had bought mine but the Friday before; I believe they are mine. WL: I am a scale-maker. I bought these two weights of a person who called himself Stephen Wallis or Welles, on the 12th October, between seven and eight in the morning, the prisoner is not the man.	Acquitted	
12 Jul 1775	Thomas Pixley Richard Rees	Theft: specified place Stealing a looking glass with a gilt frame (value £3), five mahogany tables (value £5), five feather beds (value £6), two bedsteads with printed cotton furniture (value £10), a mahogany double chest of drawers (value £4) and a mahogany chest of drawers (value 20s), the property of Anne Carter, widow in her dwelling house.	Thomas Pixley Solomon Blackman	Richard Dawson: I am a Peruke-maker in Bull and Mouth Street. I saw Mr. Pixley pay money for Mrs. Carter when she was indicted at the quarter sessions, his general character is that of a very honest man; I have known him three years, he was a scale-maker. SB - I live in Butcher Hall Lane, I am a scale beam maker. I have known Pixley this 24 or 25 years, I never knew anything particular of him, but as an honest man.	TP - guilty of stealing to the value of 39s. RR - acquitted.	TP - transportation
16 Oct 1776	Elizabeth West	Theft: simple grand larceny Stealing four cornelian stones (value 5s), a guinea, half a guinea, and 5s in money numbered, the property of John Wilson	John Wilson	I am a scalemaker: on Friday last, going up the stairs which leads to the first gallery of Covent Garden Theatre, after paying for my admittance, I saw a man that attends the box-keeper, who takes the tickets, take up half a guinea, and not supposing it to be mine I went into the gallery; I sat there about three or four minutes, and then found my right hand breeches-pocket turned inside out.	Not guilty.	
15 Jan 1778	Thomas Cantrell	Theft: burglary. Burglariously breaking and entering the dwelling house of William Astell on 5th December, about the hour of seven in the night, with intent the goods of the said William feloniously to steal.	William Astell John Partridge	WA: I am a scale-maker in King's-Head Court, Beach-Lane, my house was broke open on 25th December, near seven at night. JP: I took an apartment of Mr. Astell, I moved my goods in on Christmas Day, and went out to dinner, I returned about seven o'clock; I saw a light, I knocked at the door and called out halloo; I heard a voice which I took to be Astell's, I stood about a minute; then the prisoner opened the door with a candle in his left hand, there was another fellow behind him, the prisoner said d - n your eyes make way, and they both rushed out; I called out stop thief.	Guilty	Death. Tried by the London Jury before Mr. Recorder. (He was humbly recommended by the prosecutor to his Majesty's mercy)

Date	Defendant(s)	Offence charged	Scalesmaker(s) involved	Extract from Evidence relating to Scalesmaking	Verdict	Sentence
20 Feb 1782	Jane Sweatman Mary Humphries	Killing: murder. The wilful murder of John Thatcher, on the 28th of January last, by choking, suffocating, and strangling him with a silk handkerchief, of which the said John Thatcher did instantly die.	John Thatcher	I knew the deceased, I lodged with John Thatcher about two months before his decease, he lived in Calender's Yard, Long Alley, Moorfields, he was a scale-beam maker. On 28th January, being Monday, he came to my house, No. 18 Peter Street, Halfmoon Alley, he said, I have bought a tune, will you be so good as to play the tune for me on your flute; he asked me to take a scale-beam home for him, it was a small one to weigh silver, I delivered it to a maker on Snowhill, we went together, he chewed me the door.	JS - not guilty. MH - not guilty.	
10 Apr 1782	John Astill	Theft: specified place. On 6th March last, stealing two saddles (value 20s), a leather bridle (value 5s), a cart with wheels value (£10), two pair of harnesses for two cart horses (value £3), a sledge hammer (value 6d), 4256 pounds of potatoes (value £10), a number of sacks (value 30s), the goods of John Trevalion, privately in his stable. Another count.	William Astill	WA was called to the prisoner's character, likewise to prove an alibi. Upon his cross-examination, WA said he was purveyor of scales and weights to his Majesty, and had his Majesty's warrant for that purpose, by purveyor, he meant scale-maker, in ordinary that he lived in the butcher-row, and had the King's arms over his door.	Guilty of stealing the harness from the stable, and the potatoes from the yard, but not guilty as to the rest.	To raise sand and gravel two years on the river Thames.
10 Apr 1782	John Astill	Stealing, upon the 12th of February, in the 21st year of his Majesty's reign, 4 linen	William Astill	I am a purveyor of scales and weights to his Majesty, I live in Butcher Row, Temple Bar, I am brother to the prisoner and likewise Elizabeth Smith.	Guilty of stealing, but not in the	To raise gravel two years on the river Thames.
11 May 1782	Elizabeth Ford	Theft: simple grand larceny. Feloniously stealing twenty-three pounds weight of brass chain (value 50s), the property of William Wood.	William Astill William Wood	WA: I am a scale-maker to his Majesty. Sir, you know something about chains for scales? WA: Undoubtedly. I employ six people and I cannot see any difference between one person's work and another. It is quite a common pattern, we put these to counter scales for grocers for large weights. We employ the chain-makers out of doors, they are called garret-masters, they are not made in our house; there is nothing made in any scale-makers in London. I am a scale-maker, not a chain maker.	Not guilty.	
09 Jan 1788	John Miles	Theft: simple grand larceny. Feloniously stealing a pair of silver buckles (value 7s), the property of George Sewell.	George Sewell	I am a scale-maker in Union Street, Tottenham Court Road. I only prove my property.	Not guilty	
14 Sep 1791	Sarah Jessop	Theft: simple grand larceny. Feloniously stealing one pair of linen sheets (value 7s), one brass candlestick (value 8d).	Thomas Potley	I am a scale-beam-maker, Monkwell Street. I have known the prisoner above three quarters of a year, a very hard-working young woman.	Guilty, aged 21	Fined 1s and imprisoned three months.
01 Jul 1795	James Atkins	Theft: simple grand larceny. Feloniously stealing a seven pounds brass bell weight (value 3s.6d), the goods of James Vincent.	James Vincent	Thomas Chancellor: I am a servant to Mr. James Vincent, he is a scale-maker. Between twelve and one, when I came home I found the shop surrounded with a number of people, I enquired what was the matter? They said they did not know. I went indoors and found the prisoner at the bar sitting on a stool, the apprentice, James Dudden, says, sir, this man has stole a seven pounds weight, Mr. Vincent was not in the way. This is a particular one that is kept for adjusting people's weights about the town, the prisoner said, if I knew his situation I should give him a shilling and let him go, I told him that I should not let him go, I should take him before a magistrate. I took him before the Lord Mayor.	Guilty, aged 57	Imprisoned six months in the House of Correction and fined 1s.
28 Oct 1795	John Harris	Burglariously breaking and entering the dwelling house of Henry William Dinsall, about the hour of ten in the night of the 6th of October, and burglariously stealing therein, a gold watch (value £10), a cornelian seal set in gold (value 10s), a steel watch chain (value 8s), a gold watch key (value 2s), a gold bed hook (value 2s), one hundred and twenty-five pounds weight of sewing thread (value £80), and twenty-five pounds weight of sewing cotton (value £20)	Richard Wood	I am a scale beam maker. On 6th October, Tuesday evening, it may be some little before ten o'clock in the evening, I had just done supper, I thought I heard rather more noise than usual. I opened my door, and found a man of the name of North had a man in possession by the collar, and I was given to understand that he had made his escape out of the next house to mine.	Guilty, aged 36, of stealing, but not in the dwelling house, nor of breaking and entering.	Transported for seven years.

Date	Defendant(s)	Offence charged	Scalemaker(s) involved	Extract from Evidence relating to Scalemaking	Verdict	Sentence
20 Sep 1797	John Clifford	Theft: simple grand larceny. Feloniously stealing two iron weights (value 10s), the property of James Thomas Moffatt.	James Thomas Moffatt	Thomas Cleghorn, sworn. I belong to the Custom House; I saw the prisoner in Mansell Street, Goodman's Fields, with a half hundred weight; I informed Mr. Moffatt of it, I supposed he had stolen them; I followed him, and saw him go into a house in a lane across Whitechapel, I believe it is Petticoat Lane, I then thought it my duty to acquaint Mr. Moffatt of it; I happened to meet him in my way, in Haydon Yard, Whitechapel, and I showed him the house where it was earned to; I knew the prisoner was servant to Mr. Moffatt, he is a scale-maker in the Minories. I live next door to the shop where this man worked, I had no acquaintance at all with Mr. Moffatt; I never spoke to him in my life before.	Guilty, aged 40, of stealing goods, value 10d.	Confined six months in the House of Correction and fined 1s.
05 Dec 1798	Ann Merritt	Theft: simple grand larceny. Feloniously stealing a metal watch (value £4) and seventeen shillings and sixpence in money, the property of James Saunders.	James Saunders	I am a scale-beam-maker, in Duke Street, Southwark.	Not guilty.	
20 Apr 1803	John Decosta	Theft: simple grand larceny. Feloniously stealing a half-hundred iron weight (value 3s), the property of our Sovereign Lord the King.	Richard Vandom [should be Vandome]	I am scale-maker to the Customs. This weight is the property of the Commissioners of the Customs, it is one of the weights that I made for them, it has the broad arrow upon it. It was in use, these weights are used all along his Majesty's quays. I know this weight was made by me, for the Customs, because no other weights but these made for the Custom-house have the City mark, it is done on purpose to prevent disputes between the Custom-house and the merchant.	Not guilty.	
11 Apr 1804	Benjamin Beal	Theft: simple grand larceny. Feloniously stealing ten yards of rope	Samdiand	I do know them, they belong to the Commissioners of the Customs; I am scale maker to the Custom-house, we put the King's mark on the strong arm.	Guilty, aged 47.	Confined six months in Newgate, and publicly
18 Feb 1807	Mary Newbury	Theft: specified place. Feloniously stealing £6.6s., the property of Susannah Powell, in the dwelling house of John Probat.	Richard Ford	I am a scale maker. I live at No. 4, Broad Yard, Tummill Street, Clerkenwell. Mrs. Powell lives next door. John Probat keeps the house, he does not live there himself, he lets out the whole house in lodgings, he lives at the top of the yard in another house. She said she did not take seven guineas, she only took four. I heard her confess that the clothes that she had bought was with the money that she took from Mrs. Powell.	Guilty, aged 28, of stealing four guineas, but not in the dwelling house	Transported for seven years.
17 May 1808	James Dugden	Theft: simple grand larceny. Feloniously stealing a shift (value 6d), a shirt (value 1s), a tablecloth (value 2s), a pair of stockings (value 1s), petticoat (value 1s).	Samuel Dobson	I am a scale maker. I live at 18 Charter Street, Mile End, New-town. On Sunday 16th April, I was sitting below stairs. About a quarter before three o'clock in the afternoon, my wife said, Dobson, there is somebody up stairs, I at last went up stairs, I got within four stairs of the top, going into the room the prisoner came from behind the door, and came down stairs, I caught	Guilty, aged 20	Confined six months in the House of Correction, and publicly whipped.
03 Apr 1811	William Sadler	Theft: simple grand larceny. Feloniously stealing fourteen pound weight of prussian blue (value £3), five brushes (value 12s).	Dawson and Smith	Thomas Jones. I am a wholesale oil and colour-man. The prisoner works for Dawson and Smith, they are scale makers. The prisoner came to our house to examine our scale. We have our scales examined once a month to see that they are correct.	Guilty, aged 52	Judgement respited
15 Feb 1815	Aloes Hatfield alias Thomas Williams	Theft: simple grand larceny. Feloniously stealing 1 copper bowl (value 8s), the property of Richard Ford.	Richard Ford	I am a scale pan-maker; I live in Broad Yard, Tummill Street. Q. Did you lose a copper bowl at any time? A. Yes, on 11th February, about one o'clock in the day, it was a bowl that I made myself, I left my house about eleven, and returned at one; I saw the prisoner running down Broad Yard, with my bowl in his hand, I asked him what he was going to do with it; he said he was going to sell it. I said, sell my bowl, you rogue, I snatched it out of his hand; he rang away, I after him, I caught him in Castle Street. This is the bowl, it is mine, I am certain of it, it is worth seven or eight shillings.	Guilty, aged 11	Judgement respited
21 Jun 1815	David Mulvey	Theft: simple grand larceny. Feloniously stealing one copper sugar pan brace (value £1).	Mr. Wood	James Cunley. I saw a man coming from the ruins after the fire in Five-feet-lane. I followed him into Watling Street, he went into Mr. Woods the scale makers. John Duffell. I am in the service of Mr. Wood, in Queen Street. Two men came in and wanted to sell a copper brace.	Guilty, aged 25	Judgement respited
04 Dec 1822	Henry Strutt	Stealing two children's dresses (value 40s), the goods of Edward Smith and his partners.	James Wilkes	I am a scale-maker, and live in Golden Lane. On 2nd November, I was at work for Mr. Shorely, of Houndsditch, nearly opposite Smith's, and saw the prisoner.	Not guilty.	
07 Apr 1824	William Cole Thomas Branson	Theft: specified place. Stealing 27 lbs of lead (value 5s). The goods of William Robbins, and fixed to a building of his.	William Pattison	I am a scale-maker. I was with Robbins, and found the lead as he has stated. I found Cole concealed in the chimney.	WC guilty, aged 15 TB guilty, aged 17	Transported for seven years.

Date	Defendant(s)	Offence charged	Scalesmaker(s) involved	Extract from Evidence relating to Scalesmaking	Verdict	Sentence
30 Jun 1825	Nathaniel Stringall	Stealing, on 15th May, 4 lbs of copper (value 3s), the goods of William Ford, his master.	William Ford	I am a scale-pan-maker, and live in Broad Street, Turnmill Street. The prisoner had been in my employ for five years; I went to Mr. Ham's house in May, on some business; he shewed me some copper which had been taken from my warehouse - I knew it to be mine - I had been in the habit of missing copper for three years, I have no hesitation in swearing to it, the prisoner had not left my service. WF re-examined. Q. How many scale-pan makers are there in London? A. One besides myself - he would cut scale-pans in the same manner as I do - the prisoner confessed at Bow Street that he had taken this.	Guilty, aged 49	Transported for 14 years
27 Oct 1825	Mary Shepherd	Theft: simple grand larceny. Stealing a pair of ear-rings (value 2s), a gown value (2s), a brooch (value 2s) and a pair of drops (value 2s), the goods of John Kimber.	John Kimber	I am a scale-maker, and live in Little Prescott Street, Goodman's Fields. The prisoner was my servant for one week. The articles were found at the pawnbroker's, except the drops, which were found on her person.	Guilty, aged 17	Recommended to Mercy confined three months.
16 Feb 1826	Edward Lawson James Lawson	Breaking the peace: assault	William Peacock	I am a scale-maker, and live in Brown's Lane.	Not guilty.	
26 Oct 1826	Abraham Spradbury	Theft: simple grand larceny. Stealing 1 coat (value 10s)	Thomas Newman	I am a scale-maker, and live in Spital-fields. I saw the prisoner go up to this cart, take hold of the coat, and run off, I called Stop thief! - he threw it down, an officer took it up - I am sure he is the man.	Guilty, aged 22	Transported for seven years.
07 Dec 1826	William Partridge	Theft: specified place. Stealing 5 mills (value £3) and 4 weighing-machines (value £5), the goods of John Yearly, his master in his dwelling house.	John Yearly	I am a mill and machine-maker, and live in High Holborn. The prisoner was in my employ four months, up to the time of his apprehension, as a journeyman weighing-machine maker, at weekly wages.	Guilty, aged 24, of stealing to the value of 39s only.	Transported for seven years.
13 Sep 1827	Mary Wittenback	Killing: murder. The wilful murder of her husband.	James Davis	Amelia Davis I am the wife of James Davis, who is a scale-maker, and lives in Brill Place, Somers'-town. The prisoner and her husband lodged in my house. I said "Oh! Mr. Wittenback, what is the matter?" he said, "Oh! Mrs. Davis, I am very bad - I think I am poisoned".	Guilty, aged 41	Death
11 Jun 1829	William Reed	Theft: simple grand larceny. Stealing 1 copper scale (value 8s), the goods of Thomas Burchfield.	Thomas Burchfield James Wilkes	TB: I am a scale-beam maker. About two o'clock in the afternoon, I saw this scale safe in my shop, and a little after eight it was gone - I ran out, saw the prisoner running, and one of my young men stopped him, I saw the scale taken from under his coat - he could reach it from the door, he appeared to be drunk or stupid. JW: I am in the service of Mr. Burchfield. I stopped the prisoner, and found the scale under his coat.	The prisoner pleaded distress Guilty, aged 21	Fined one shilling and discharged.
03 Dec 1829	James Diney William Shedwick	Theft with violence: robbery. Feloniously assaulting William King, at St. Leonard, Shoreditch, putting him in fear, and taken from his person, and against his will, 1 watch (value £3), 1 hat (value 9d), and 1 handkerchief (value 2d), his property.	George Rouse	I am a scale-maker. On the night of 28th November I was with the prosecutor at the Crown and Shuttle, in Shoreditch, which is kept by Mr. Turner; I went in a little after nine o'clock - the prosecutor came about ten - we remained there till past twelve - he drank pretty freely, he was sober when he came in; I was not exactly sober, nor quite drunk.	JD: guilty, aged 23 WS: guilty, aged 30	Death
08 Sep 1831	Henry Smith William Barnes	Theft: pick pocketing. Stealing 1 hat (value 1s 6d), 1 pair of shoes (value 5s), 1 shirt (value 3s), 1 neck handkerchief (value 6d), 1 pair of stockings (value 6d), 4 half-crowns, and 2 shillings.	William Clemen Robert Wood	WC: [NB Proceedings clearly record the name as Clemen] I am a scale-maker and live in Smithfield. On 28th August, about five o'clock, I saw the prosecutor asleep in the pens; he then had his hat and shoes on - I saw both the prisoners there about five minutes after; they came up to him, from West Street, and took off his shoes and hat, then one of their companions who is not in custody, took the hat and shoes down West Street - they went away, came back again in about five minutes to try his pockets, I saw them take a white parcel, which appeared a shirt, from his coat pocket - they then went away; I went next door to my brother-in-law to inform him - and soon after they returned a third time, one of the prisoners laid down by the prosecutor's side, and rifled his pockets - I pointed them out to my brother-in-law, he went and they were secured - the third person was only with them the first time. RW: I am Clemen's brother-in-law. I was informed of this, I saw the prisoners return to the prosecutor, and rifle his pockets, I went and procured an officer, and had them taken.	HS: guilty, aged 21 WB: guilty, aged 17	Transported for life.

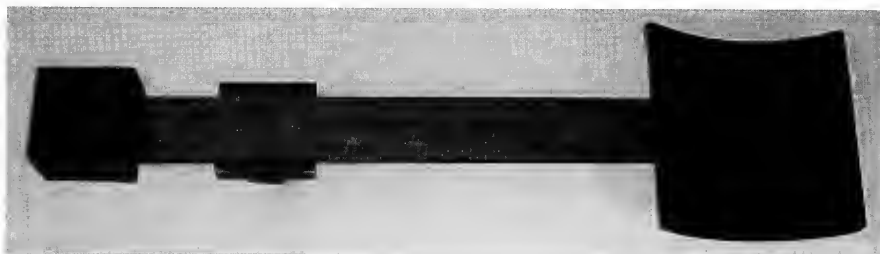
Date	Defendant(s)	Offence charged	Scalesmaker(s) involved	Extract from Evidence relating to Scalesmaking	Verdict	Sentence
05 Apr 1832	James Caple	Theft: simple grand larceny. Stealing 1 weighing-machine (value £1.15s), the goods of Thomas Burchfield	Thomas Burchfield	I am a weighing-machine maker, and live in Smithfield. On 26th March, about five o'clock in the morning, our inspector called me up - he had the prisoner at the watch-house; he had been on and off in my employ for two years, and was so five weeks before. I saw this machine at Guildhall, and recollect I had seen it safe in the yard, near my house, on Sunday night; there was a quantity of them under tarpaulin - it was not locked up; anybody could come into the court. I saw the prisoner on my premises a week before, and told him to go away.	Guilty, aged 33	Confined three months
05 Apr 1832	Thomas Heard	Theft: simple grand larceny. Stealing 1 weighing-machine (value £3), the goods of David Scott.	Thomas Heard William Clark Wright	Thomas Heard. I am a weighing-machine maker, now carrying on business in Long Lane, Smithfield, have lived all my life in the neighbourhood. I was applied to by Mr. Scott, the prosecutor, while I resided in Barbican, to go to his house to look at the machine, which wanted repairing; I agreed with him about it and was to send for it and repair it when it suited me. I went with my apprentice and my journeyman, with a truck for the machine; Mr. Scott was not at home, and Mrs. Scott said she knew nothing about it, but her son said he heard his father agree with me about it.	Guilty, aged 33	Confined three months
14 Feb 1833	Alexander Smith Edward Vickerman	Theft: simple grand larceny. Stealing 2 scales (value 12s) and 3 scale-beams (value 5s), the goods of George Bather, and that Vickerman had been before convicted of felony.	James Bromley	I am apprentice to George Bather, a scale-maker - when the officer brought the prisoners into our shop, I missed these articles, they are my master's, and had been in the middle of the shop.	AS - guilty, aged 29 EV - guilty, aged 19	AS transported for seven years. EV transported for fourteen years.
16 May 1833	Madford John Spring	Deception: forgery. Indicted that he, having in his custody a certain bill of exchange for 29l. 14s.,	Thomas Ursden G	I am the brother of the last witness, I live at No. 227 Shoreditch, and am a scale-maker.	Guilty, aged 30 Recommended to Mercy.	Transported for life
02 Jan 1834	John Johnson alias Coveney	Deception: forgery. Feloniously forging a certain order for payment of money.	Samuel Burchfield	I am a scale-maker, and live in Smithfield. I remember selling a weighing machine to the prisoner. He paid me a £10 note for it - it came to £1.16s - I gave him the whole change of the note, and he did not pay me.	Guilty of uttering only, aged 53	Transported for life.
20 Feb 1834	Joseph Wire Samuel Lambert	Theft with violence: robbery. Feloniously assaulting James Wilson, at St. Leonards, Shoreditch, with intent to steal his goods, monies and chattels, from his person, and against his will, against the Statute.	Gower	JW - I had been to Shoreditch, to Gower's house - he is a weight and scale maker (text mixes 'Gower' and 'Grower')	Not guilty.	

About the Author: Richard Herbert has been Managing Director of the Herbert Group since 1986, the 5th generation of the family to hold this position. The group, headquartered in Haverhill Suffolk employs 200 people, and has two trading companies, Herbert Retail who supply scales to supermarkets such as Tesco, Marks & Spencer and Sainsbury, and Herbert Industrial who manufacture high speed weighing, labelling and robotic packing equipment for the food industry.

Showcase

This German Mirakel die neue Brief- und Küchenwaage (the new Postal and Kitchen scale) was made by Konstanzer Holindustrie G.M.B.H. It is made of red stained wood with a paper label. Its capacity is 1000 grams and it measures 26 inches long and the plate is 6³/₄" by 6⁷/₈"

Berning collection



The Harvard Trip Scale

BY DEBORAH JEAN WARNER

“The use of the trip scale for laboratory work really began with the publication of the Harvard College pamphlet, *Descriptive List of Elementary Physical Experiments* in 1887. The balance recommended in this publication soon became known as the Harvard Trip Scale. Central Scientific, Catalog F (Chicago, 1923), p. 29.

Harvard prepared its *Descriptive List of Elementary Physical Experiments* after deciding that students preparing for college might satisfy their physics requirement through laboratory experience instead of through book learning, and Edwin Hall, an assistant professor of physics at Harvard, wrote his *Text-Book of Physics, Largely Experimental* so that high schools around the country could help their students meet this requirement. An appendix to Hall’s book listed the apparatus needed for 12 students, and on this list one finds 6 *Fairbanks platform balances (Harvard)*. The text explained that these balances were to be used to measure specific gravity; the accompanying illustration clearly shows a trip rather than a platform scale¹.

Fairbanks is the firm in St. Johnsbury, Vt., that had invented the platform scale in 1830, and that had been offering “even balance trip scales” since at least 1859². The basic trip scale is a rugged and inexpensive Roberval balance designed for weighing food, drugs, and other such merchandise. In this form, the load is superimposed on the beam rather than suspended from it, and the two pans remain level and in the same orientation as they move up and down. It uses external weights for rough weighing, and sliding weights on the scale beam for fine weighing. The term “Roberval” refers to the French mathematician, Gilles Personne de Roberval, who described the [principle] form in 1669. The “trip” designation seems to be American, and probably means “a projecting part of some mechanism which comes into momentary contact with another part so as to cause or check some movement.”³

The popularity of the Harvard list and of Hall’s text insured the

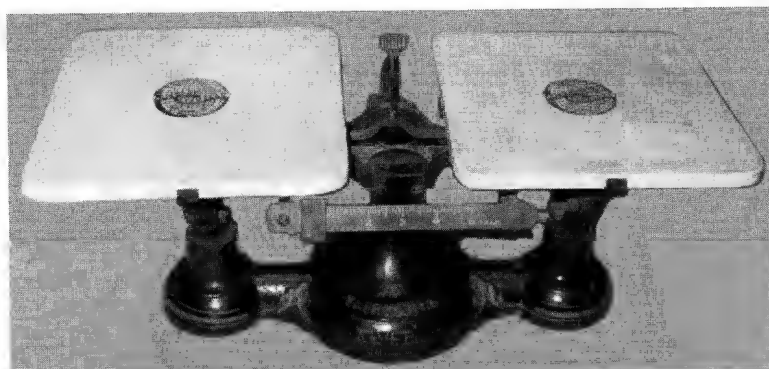


Figure 1 ▲▲ This Harvard Trip Scale was pictured in Fairbanks Standard Scale catalog of 1906 and Fairbanks Scales catalog No. 531 of 1911. The beam is graduated from 1 to 5 grams by $\frac{1}{10}$ gram and is nickel plated. The porcelain plates bear the Fairbanks globe symbol. Painted below the cast Fairbanks name is Knott, Boston.



Figure 2 ▲▲ The Harvard Scale was shown in the 1913 edition of “Henry Troemner’s Standard of Excellence Balance Scales Weights” catalog. Listed on page 29 the tag on this version reads Capacity 1 KG Model no. 436.



Figure 3 ▲▲ Detail from front base of the Troemner scale shown above showing label and “Harvard Scale” Painted on the base.

popularity of the Harvard Trip Scale. Henry Troemner of Philadelphia offered a *Harvard Scale that was well suited for elementary experiments in physics, chemistry, and general laboratory use* as early as 1890⁴. Alfred P. Gage, a Boston educator who promoted laboratory instruction in physics in secondary schools, offered a *Balance, platform trip* in his 1892 catalog, noting that this instrument was *in general use in Harvard University*.⁵

With the ensuing explosive growth of the academic market, other instrument firms began advertising Harvard trip scales featuring their own minor modifications. Many of these modifications pertained to such issues as sturdiness, accuracy, sensitivity, and ease of manufacture and use, but there is little evidence suggesting that one brand was significantly better than another. The Franklin Educational Company, also of Boston, claimed that its Franklin Trip Scale was *an improvement of the former Harvard Trip Scale which has been so popular for elementary physical and chemical experiments and general laboratory use*.⁶

The Central Scientific Company of Chicago analyzed a Harvard trip scale in 1905, and found that its sensibility was low to begin with and *rapidly diminished by exposure to chemical fumes, making it useless for anything but the roughest kind of weighing*. By 1909, Central Scientific was offering a re-designed instrument that promised *a degree of perfection never before attained in assembling this style of balance*. This *Cenco Agate Bearing Trip Scale, Harvard design* had brass and steel parts *neatly formed by elaborate tools and machinery* (in place of the cast and forged iron parts of the original). Its bearings consisted of hardened steel prisms resting on six large agate shelves (rather than steel knives resting in grooves filed in the carriage and pan holders), and this increased *the initial sensibility of the scale and its ability to retain its sensibility after long continued use*. It had a range of 10 grams in $\frac{1}{10}$ gram division, like the original, but its capacity was increased from 1000 to 2000 grams. The word *Cenco* meant that the instrument had been designed and made in-house.⁷

Herman Paul Sachse, an immigrant who had worked for several German instrument firms before joining Central Scientific in 1918, went about making further improvements to the *appearance, performance and durability* of the instrument. His first patent on the form carried the title, *Mounting for Bearings*, but the illustration showed a Harvard trip scale. The text explained that *On account of the exact nicety of alignment*

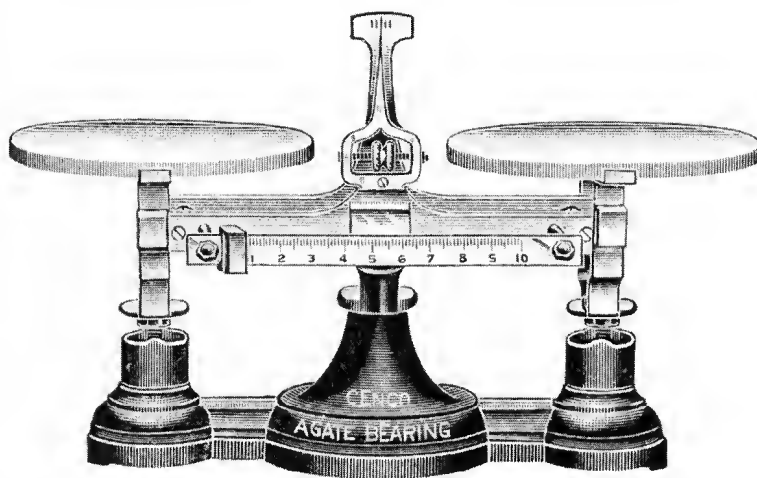


Figure 4 ▲▲ This Cenco Harvard Trip Balance appeared in Central Scientific Co., Catalog C-222. Laboratory Apparatus (Chicago, ca. 1922), p43.

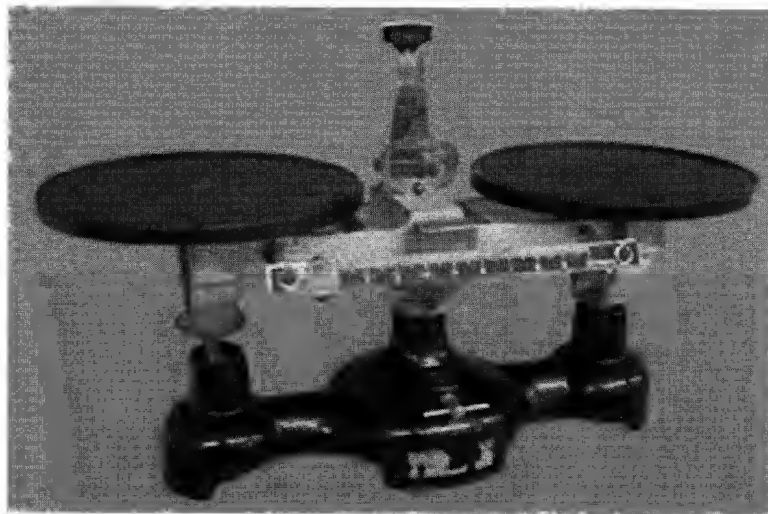


Figure 5 ▲▲ Welch made this Trip scale. It is equipped with black bakelite plates and a 10 gram capacity beam.

required it has been necessary to employ highly skilled labor for this work and to supply specially designed and accurately constructed jigs and fixtures with which to locate and sustain the bearings in place while the cementing was accomplished. The object of this invention is to avoid this expensive procedure by an operation which brings this specialized work within the abilities of the ordinary mechanic. Sachse's second patent, this one filed in 1923, described a method of easily adding shot to compensate for differences between the aggregate weights of different parts of the balance. The *Cenco-Improved Agate-Bearing Trip Scale*, available by 1923, incorporated both of these features. Sachse's third trip scale patent, filed in 1932, further enhanced the accuracy and sensitivity of the instrument. Central Scientific claimed in 1937 that their trip scales were *the most convenient, heavy duty balances for general use in any laboratory*, and this statement remained in the books for several decades.⁸



Figure 6 ▲▲ This Ohaus Harvard Trip Balance is made of heavy cast iron and has milk or opal glass plates.

Central Scientific purchased several full-page advertisements touting its agate bearing trip scales in 1930. With capacity increased to 5000 grams, the basic form was *in every specification the most serviceable scale that could possibly be made, and the most accurate*. Moreover, *Large volume production makes possible a selling price of ten dollars*. A new form, with two beams rather than one, could weigh up to 220 grams *without the use of platform weights*. A later advertisement noted that these Cenco instruments were *Built to Withstand Student Usage in Educational Chemistry Laboratories*.⁹ These advertisements might be read as an indication of the importance of the trip scales for Central Scientific's bottom line. They might also be read as a recognition of the strength of the competition.

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The W. M. Welch Manufacturing Co., also of Chicago, gave Central Scientific a run for their money when it came to scientific apparatus for high schools and colleges. The firm was established by William M. Welch, a school superintendent in Maquoketa, Iowa, who began making and marketing the nation's first system of awards for school attendance and scholarship in 1880. Welch moved to Chicago in 1891, and was soon offering a wide range of scientific instruments and other school supplies.¹⁰ Welch claimed a position in the weighing market in 1922 with a full-page advertisement in *Science* touting its *Laboratory Balance. Improved Design* and its *Balance, Harvard Trip, Agate Bearing*. The latter had a capacity of 2,000 grams, a sensibility of 0.1 gram, platforms made of

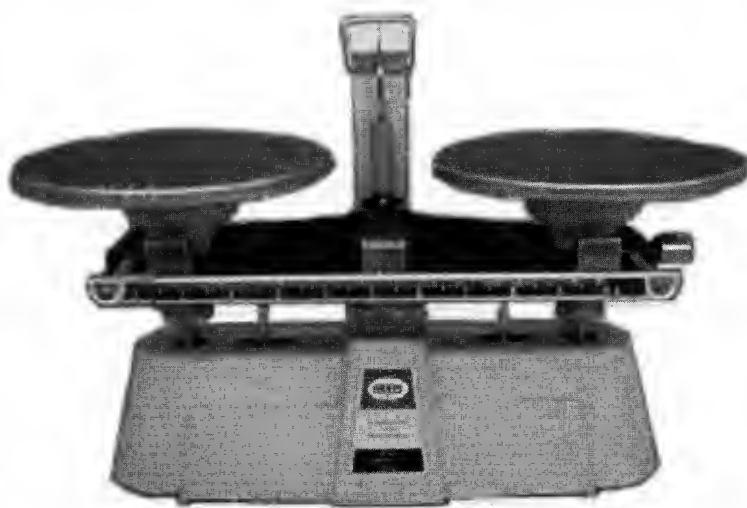


Figure 7 ▲▲ This modern Ohaus Harvard Trip Balance is made of plastic with stainless steel plates.

porcelain, and the entire balance work *mounted on a heavy iron base very nicely japanned*.¹¹

Reinhold A. Kopp, a Chicago instrument maker, patented a "Scale Pan" in 1930. The design promised to provide *a bakelite, molded disc to replace the opalite glass top generally found upon scales,... better facilities for securing the agate bearings upon a scale pan,*" and *"an improved assembly of parts giving a more rigid construction and a greater precision than is obtained in the convention assembled scale pan.* Welch obtained the rights to Kopp's patent at the time of issuance, and incorporated these features in its *Harvard Trip Balance, with Bakelite Pans*. This new instrument—which was also designed so that *every knife edge rests on an agate bearing*—remained on the market for decades. So too did Welch's *Triple Beam Trip Scale*, also introduced at this time.¹² Following Welch's lead, Central Scientific offered balances with bakelite pans; and following Central Scientific's lead, Welch offered double-beam trip scales.

Other American instrument firms were also in the business. Bausch & Lomb in Rochester, New York, offered a *Balance, Harvard Trip* in 1904, noting that it was intended for *general laboratory use*.¹³ In Philadelphia in 1906, Arthur H. Thomas offered a similar instrument for \$5.40.¹⁴ Knott in Boston boasted in 1916 that its form of the trip scale was *such as to make it the most convenient balance for laboratory work*.¹⁵ Noting that the instrument *commonly known as the Harvard Trip Scale was suitable for laboratory or similar work*, Fairbanks offered a version with opal glass plates and a side beam, with or without agate bearings.¹⁶ By 1919, Troemner was boasting a *Harvard Scale* that was *fitted with 'V' shape bearings, into the bottom of which is set a piece of the finest steel, giving the scale a hard bearing, that cannot be nicked and thus make the scale hang and stick*. This instrument, they said, *ought not to be compared with the cheap round 'U' shape bearing scale, commonly sold by supply houses*.¹⁷ Frederick M. Stevens developed a method that would expedite the manufacture of the bearings of trip scales, and assigned his patent to John Chatillon & Sons, a New York firm that offered trip scales for butchers, druggists, and grocers.¹⁸ Eimer & Amend, also of New York, offered single and double beam Harvard trip scales with patented threaded hub scale plates, patented semi-rigid agate bearings, and patented dust proof self locking bearing cover.¹⁹ Fisher Scientific of Pittsburgh had its own version of the popular '*Harvard Trip*' design on the market by 1942, claiming that the *self-aligning construction of the bearings* set it apart from the competition.²⁰

Ohaus, which began making Harvard Trip Scales in 1912, traces its history back to 1907 when Gustav Ohaus went into business with his father Karl, a scale mechanic in Newark, N. J. They began trading as the Newark Scale Works in 1914, and introduced "OHAUS" as a trade name in 1920. In 1927, Gustav Ohaus received a patent for a *weighing-scale plate* that was made of glass or other vitreous material; it was formed with a means for coupling the plate with its support *so that not only is the necessity for clamp straps obviated, but the operations of assembling the parts is greatly simplified and cheapened, while nevertheless producing a stronger, neater and more efficient finished structure*. A second patent, this one issued in 1929, described a trip scale that was *extremely sensitive yet of simple construction and reliable in operation*. The firm noted in 1939 that they had *specialized for the past 27 years in producing Harvard Trip Scales of the highest quality* and, having invested in *machinery and dies for mass production*, could now *offer these balances at prices lower than the many inferior types on the market*. Their instrument had eight distinguishing features: patented scale plates that were made of white opal molded glass, and that were easily interchangeable; cadmium plated finish on all knife edges and working parts; a hole in the base for specific gravity experiments; patented semi-rigid agate bearings; patented dust proof self locking bearing covers; rigidly constructed beam and machine ground knife edges; ornamentation and fittings; and dealers name on the base (they did not sell directly to end users, but only through reputable dealers). The Newark Scale Works became the Ohaus Scale Corp. in 1947, and the Ohaus Corp. in 1988. Since the 1970s it has been the largest manufacturer of Harvard Trip Scales.²¹

Acknowledgements

The author wishes to thank Steve Beare for his help with this article and Cliff Lushbough and Jim Dietrich for photos.

Notes:

1. Edwin H. Hall and Joseph Y. Bergen, *A Text-Book of Physics, Largely Experimental* (Boston, 1893), p. 56, 64, and Appendix X, pp. 383-384. The first edition of this book appeared in 1891.
2. E. & T. Fairbanks, *Illustrated Catalogue and Price List of Platform and Other Scales* (New York, 1859), pp. 23, 24 and 27.
3. "Trip" in *Oxford English Dictionary*.
4. Henry Troemner, *Fine Scales and Weights* (Philadelphia, 1890), p. 51 and 13.
5. A. P. Gage & Son, *Catalogue of Physical and Chemical Apparatus* (Boston, 1892), p. 7. See also Steven Turner, "The Reluctant Instrument Maker: A. P. Gage and the introduction of the student laboratory," *Rittenhouse* vol. 18, no. 2 (2004): 40-61.
6. Franklin Educational Company, *Physical Apparatus Catalog* (Boston and Chicago, 1899), p. 28.
7. Central Scientific, *Catalog M* (Chicago, 1909), p. 266; and *Catalog M* (1914), p. 299. For the 1905 date see *Catalog F* (1923), p. 29. The scale probably also appeared in *Catalog M* (1906), but no copies of this publication can now be found.
8. Central Scientific, *Catalog F* (Chicago, 1923), p. 29; and *Catalog H357* (1937), p. 8. H. P. Sachse, "Mounting for Bearings," U.S. Patent 1,488,713 (1921/1924); "Balance," U.S. Patent 1,526,569 (1925); and "Trip Scale," U.S. Patent 1,859,604 (1932). These Sachse patents were assigned to Central Scientific. So too was P. E. Klopsteg, "Weighing Balance," U.S. Patent 1,775,246 (1930), but this was not obviously incorporated into any actual instruments. For Sachse see "They Also Serve. . .," *Cenco News Chats* 34 (1941): 2. "Herman Paul Sachse," *Cenco New Chats* 3 (1933): 11.
9. Central Scientific ads in *Science* 72 (Aug. 8, 1930), *Science* 71 (Jan. 10, 1930), and *Journal of Chemical Education* 14 (Oct. 1937).
10. W. M. Welch Manufacturing Co., *Catalog #3* (Chicago, 1915-1916). This mentions other Welch catalogs that might have offered balances, but they have not yet been found.
11. Welch ad in *Science* 55 (March 31, 1922).
12. R. A. Kopp, "Scale Pan," U.S. Patent 1,756,292 (1930); and "Scale Beam," U.S. Patent 1,872,465 (1932). Welch ad for "A New Triple Beam Trip Scale" in *Science* 70 (Sept. 20, 1929); and *Catalog G* (Chicago, 1930), p. 332.
13. Bausch & Lomb, *Apparatus and Supplies for Chemical and Biological Laboratories* (Rochester, New York, 1904), pp. 41-42.
14. Arthur H. Thomas, *Laboratory Apparatus* (Philadelphia, 1906), pp. 32-33.
15. L. E. Knott, *Catalog of Scientific Instruments* (Boston, 1916), p. 55.
16. Fairbanks, Morse Co., *Fairbanks Scales. Catalog 67* (1918), p. 30.
17. Troemner, *Catalogue 1919* (Philadelphia, 1919), p. 14.
18. F. M. Stevens, "Scale," U.S. Patent 1,351,449 (1920). John Chatillon & Sons, *Scales. Catalog No. 19* (New York, 1927), pp. 181-187.
19. Eimer & Amend, *Bulletin 496* (copy bound with Eimer & Amend, *Catalog BCM* (New York, 1927).
20. Fisher Scientific, *Modern Laboratory Apparatus* (Pittsburgh, 1942), pp. 56-57.
21. G. Ohaus, "Weighing Scale Plate," U.S. Patent 1,627,710 (1927); and "Trip Scale," U.S. Patent 1,732,612 (1929). Newark Scale Works, Inc., *Laboratory Scales and Weights. Catalogue B* (Newark, [1939]), pp. 3-11; and *Laboratory Scales and Weights. Catalogue C* (Newark, [1945]), pp. 3-11. [Http://www.ohaus.com/about/history](http://www.ohaus.com/about/history)

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